IFRC

INTERNATIONAL FIRST AID, RESUSCITATION AND EDUCATION GUIDELINES 2025

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Audience: First aid programme designers, programme managers, education and scientific committees, trainers

Red Cross Red Crescent Networks
Coordinated by IFRC Global First Aid Reference Centre

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International first aid, resuscitation and education guidelines 2025
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Foreword

As we share the 2025 edition of the IFRC International First Aid, Resuscitation and Education Guidelines, I am struck by both the enduring relevance of first aid and the remarkable progress made across our Red Cross and Red Crescent network to ensure that life-saving knowledge is placed in the hands of millions.

Over the past five years, the world has continued to face profound challenges: public health emergencies, natural disasters driven by climate change, conflict and displacement, and rising mental health needs. In every crisis, one constant remains - people helping people by placing humanity at the centre of our work. But how? First aid remains one of the most empowering tools we have to preserve life, reduce suffering, and foster resilience in communities.

First aid is not only part of our legacy - it is central to our future. It stands at the heart of the IFRC Strategy 2030, anchoring our ambition to support strong local action and global solidarity. As we build a future rooted in community health, equity, and preparedness, first aid is an essential pathway to achieving our collective vision.

This 2025 edition marks a significant milestone in the global leadership of the International Federation of Red Cross and Red Crescent Societies (IFRC) in first aid education. This comes on the heels of other important milestones. In 2022, the General Assembly of the IFRC unanimously adopted its new First Aid Policy and its First Aid Vision 2030 with the objective of repositioning first aid at the core of our action. In 2023, the IFRC became a collaborating member of the International Liaison Committee on Resuscitation; an extraordinary achievement that affirms the credibility, scientific rigour and global impact of our work.

What distinguishes these Guidelines is not only their foundation in up-to-date research and best practices, but their grounding in the diverse realities of our Red Cross and Red Crescent network. With 191 National Societies operating in vastly different social, economic, and cultural contexts, our approach to first aid is uniquely shaped by local wisdom and needs.

The contributions from every region of the world have made this edition truly global and deeply committed to the operational reality of everyday life in our National Societies. Through our contextualization and engagement, more than 60 National Societies and IFRC offices contributed their knowledge and experience directly to the work. The Guidelines serve as both a resource and a reflection of the Red Cross Red Crescent's unparalleled reach and commitment to first aid for all. They are built not only on scientific evidence, but on the lived practice and insight of thousands of first aid trainers, education programme designers, volunteers, and learners around the world.

I commend the IFRC Global First Aid Reference Centre and IFRC Health and Care Department for their stewardship of this process. I also thank the many National Societies, researchers, and practitioners who have contributed their voices, knowledge, and passion. These Guidelines are a testament to our shared belief that everyone, everywhere, should have the confidence and ability to save a life.

Sincerely,

Jagan Chapagain
IFRC Secretary General

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- Canadian Red Cross
- International Committee of the Red Cross
- International Federation of Red Cross and Red Crescent Societies

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- Belgian Red Cross, Centre for Evidence-Based Practice
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- Red Cross Red Crescent Movement MHPSS Hub
- Scientific Advisory Council of the American Red Cross
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INTRODUCTION

First aid is a core area of work of the International Federation of Red Cross and Red Crescent Societies (IFRC). All 191 National Red Cross Red Crescent Societies around the globe deliver first aid services, or implement first aid education or awareness programmes.

We believe that first aid is a vital initial step in providing effective and rapid intervention, which can help reduce injury and suffering and improve the chances of survival. Taking immediate action and applying appropriate first aid measures makes a difference. Having high-quality, evidence-based first aid education available to people worldwide contributes to building safer and healthier communities by preventing and reducing risks in daily emergency, disaster and crisis situations.

First aid is part of a common vision: to inspire, encourage, facilitate and promote humanitarian activities by alleviating human suffering and respecting human dignity. We believe everyone has the potential to save lives. First aid education and services are essential tools for achieving these goals.

We advocate for first aid to be accessible to all and that at least one person in each household has access to learning first aid, regardless of their socio-economic status or other potentially discriminatory factors.

IFRC first aid vision 2030

The IFRC First Aid Policy and the IFRC First Aid Vision 2030 were adopted by the General Assembly of Red Cross and Red Crescent National Societies in June 2022.

The First Aid Policy states that first aid is an act of humanity, showing a willingness to help others and save lives without discrimination through impartiality, neutrality and independence. First aid, as we know it today, is built through the unity of individuals who contribute through voluntary service, reflecting the universality of need throughout the world.

In 2030, first aid is:

- Universal in that it is available to all who are motivated to help themselves, their families and communities in an emergency, with one person trained in first aid by National Red Cross Red Crescent Societies in every home, workplace and school.
- Recognized as a force of humanity that is integral to the foundations of the IFRC and National Societies, as reflected in the IFRC Strategy 2030, and recognized as the partner of choice by public authorities, other stakeholders and the public.
- Mainstreamed in the activities of the IFRC to build resilience, accountability and trust within communities globally.

The IFRC First Aid Vision 2030 and its operational framework are part of IFRC First Aid Policy 2030.

This First Aid Vision 2030 covers six priority action areas. These priority action areas serve to focus the efforts of the IFRC and National Societies regarding first aid. The areas are:

1. First aid education
2. Standards and qualifications
3. Research, evidence and evaluation

4. First aid in schools
5. Commercial first aid
6. Pre-hospital emergency care and operations

Based on its deep commitment to science-based first aid and resuscitation, and considering the longstanding collaboration with the International Liaison Committee on Resuscitation (ILCOR), the IFRC became a collaborating member of ILCOR in June 2023.

About the IFRC Global First Aid Reference Centre

The IFRC Global First Aid Reference Centre (GFARC) was established in 2012. The Reference Centre is hosted and supported by the French Red Cross and collaborates with 191 National Red Cross and Red Crescent Societies, as well as scientific bodies, academic institutions and private sectors.

The Reference Centre aims to reduce the number of deaths and the severity of injuries by supporting National Societies in scaling up and improving the quality of first aid education and services worldwide. It works closely with National Societies to enhance first aid programmes and services based on science, facilitate knowledge sharing, promote good practice, distribute skills and advocate for first aid for all.

To ensure the IFRC first aid is evidence-based and remains relevant to national and local contexts, the Reference Centre works with National Societies' first aid, medical and education experts, and the ICRC, and participates in numerous studies and research. The IFRC *International first aid and resuscitation guidelines 2025* is a key outcome of such an effort.

Number of people reached

In 2023, more than 22 million people were trained in first aid by NationalRed Cross Red Crescent Societies, according to the global survey carried out in 2025 by the Reference Centre. 126 out of 191 National Societies responded to the survey. Around the globe, the National Red Cross Red Crescent Societies have almost 150,000 active first aid trainers.

Every year more than 100 National Red Cross Red Crescent Societies participate in the World First Aid Day on the second Saturday of September with the support of the Reference Centre. During this event, almost one million volunteers and staff are mobilized and reach out to millions of people through social media and public events with the aim of raising awareness among the public and partners about the importance of first aid, particularly first aid education.

About the 2025 IFRC Guidelines

The *International first aid resuscitation and education guidelines* 2025 evaluate and report on the science and best practices behind first aid, resuscitation and education. The 2025 Guidelines have been produced with the main goal of supporting National Societies in harmonizing first aid practices across the Red Cross Red Crescent Movement by providing a strong evidence base. This includes working in collaboration with many partners, including those that are part of the Movement, such as National Societies, IFRC Region and field offices, the International Committee of the Red Cross Red Crescent, reference centres and other international organizations, such as ILCOR. This forms a key part of the quality assurance that people receive

first aid education in accordance with the most up-to-date science and best practices from experts and practitioners.

The *International first aid, resuscitation and education guidelines* form the basis of various programmes developed by the IFRC to improve and promote high-quality first aid programmes across the National Societies. The International First Aid Attestation delivered by GFARC is a continuous quality improvement process and recognition, awarded when a first aid training course provided by a National Red Cross Red Crescent Society, is consistent with the latest IFRC Guidelines. GFARC's international first aid education programme aims to develop trainers of trainers within National Societies based on the latest pedagogical science, in order to distribute high-quality education skills throughout the training systems of the NationalRed Cross Red Crescent Societies.

The Guidelines do not replace first aid manuals and associated educational materials. Instead, they serve as the foundational resources for first aid programme designers to develop their first aid materials such as manuals, programmes, courses, learning apps, digital products, public information and associated educational materials. National Societies should use and adapt the Guidelines according to their local cultural, linguistic, technological, environmental and legal contexts, including the local prevalence of injuries and illnesses. The adaptation must also consider the populations' capacities and available resources. In addition, the Guidelines provide scientific evidence for first aid programme managers and designers to make strategic decisions.

First aid education

Through engaging with first aid education and the fundamental principles of the IFRC, we reinforce the values of humanity by giving people the skills, confidence and willingness to help. It is the role of the Red Cross Red Crescent Movement to champion first aid education as a universal means to help people engage in more helping behaviours and to live more safely, be more resilient and provide care when needed.

The IFRC views first aid as one of the greatest humanitarian acts, for which first aid education has an integral part in building personal and communal resilience. As such, it is the duty of the IFRC to advocate for and provide effective, high-quality, affordable and accessible first aid education to everyone.

The IFRC's effectiveness will be magnified if first aid actions are recognized and encouraged by healthcare professionals. Embedding first aid education into national health policies and culture, both as a life skill that is learned by all, and a resilience and emergency response tool that is recognized as a vital part of health systems, is an important role for the NationalRed Cross Red Crescent Societies. The 2025 Guidelines promote evidence-based practice as the foundation for first aid education by ensuring that the best available scientific evidence is combined with the preferences and resources of the target group and the practical experience and expertise of experts in the field.

A fundamental distinction is made between harmonization and standardization. The intention is not to have a separate technique for each situation or to produce recommendations to be implemented in the same way everywhere regardless of context, but rather to establish a consensus on minimum agreed-upon principles. This consensus is based on a critical review of

the available evidence and information learnt from the experiences of the Red Cross Red Crescent Movement.

Link to IFRC's Strategy 2030

First aid is central to the five global challenges identified in the IFRC's Strategy 2030:

1. Climate and environmental crises: first aid as a resilience enabler allows communities to prepare for and respond to local climate-related emergencies.
2. Evolving crises and disasters: first aid education develops communities' capacity to respond immediately, particularly in cases where emergency medical services are delayed or hindered.
3. Growing gaps in health and well-being: first aid empowers communities in prevention, health promotion and psychological first aid according to common injuries and health priorities, reducing the burden on health systems.
4. Migration and identity: first aid facilitates the inclusion of vulnerable people and migrants to learn first aid and save lives, regardless of their situation.
5. Values, power and inclusion: first aid is an act of humanity, showing a willingness to save lives without discrimination.

The Guidelines provide evidence and good practice in first aid knowledge, treatment and education to contribute to the IFRC 2030 Strategy. By promoting and using proven first aid techniques to address key emergency-related injuries, we can build local communities' preparedness and response capacity.

Definitions

First aid is the immediate assistance provided to an ill or injured person until professional help arrives. It is concerned not only with physical illness or injury but also with psychosocial support for people who are emotionally distressed due to experiencing or witnessing a traumatic event. First aid interventions seek to alleviate suffering, prevent further illness or injury and promote recovery.

First aid provider is defined as someone trained in first aid who should recognize, assess and prioritize the need for first aid. The first aid provider provides care using appropriate competencies, recognizes limitations and seeks additional care when needed.

This document refers to the ill or injured person requiring first aid as the **person**. First aid educators should use the appropriate term according to their local contexts. This person may be described as the person in need of care, patient, victim, casualty or other terms.

Emergency refers to an incident where first aid is required. An emergency can be small or large and can happen in a private or public space.

Emergency medical services (EMS) signify that the first aid provider should quickly access the next available higher level of care. In some places, EMS may mean an ambulance service and hospital, while in others it may mean contacting a local healthcare worker or travelling to a field hospital. Programme designers will need to adapt the language according to the local context in which it is used.

First aid education is a programme that develops behaviours, knowledge or skills in first aid procedures and techniques. This programme has defined outcomes and is provided by qualified facilitators or published physically or virtually.

First aid services may provide first aid at public events or respond to potential emergencies, among others. These services are based on agreements established between local authorities, event organizers or local communities and the organization providing the service.

Levels of first aid provider

The levels of providers available around the world vary considerably. The continuum below describes the increasing level of training and responsibility of providers. The Guidelines support first aid, resuscitation and education for the following levels of first aid provider.

Level	Description	First aid training or responsibility	Example of care Varies significantly by National Society
Bystander	A bystander happens to be present during an incident that requires first aid; however, they may not be directly involved. A bystander can provide basic care and follow specific instructions from a higher level of support.	No formal training Contact others (first aider, EMS) to request care.	Access EMS and request care. Maintain direct pressure on a bleeding wound as directed.
First aid provider	A first aid provider can recognize, assess, and prioritize the need for first aid, providing appropriate care. A first aid provider should provide care to their level of training. If there is no access to medical care, a first aid provider does the best they can do.	First aid education was completed at some point, but skills are likely not used regularly or are refreshed through training. Contact EMS to request care if required and provide first aid according to training.	Do CPR on a person who does not show signs of circulation. Apply a splint to an injured limb.

Level	Description	First aid training or responsibility	Example of care Varies significantly by National Society
Designated first aider	A designated first aider is similar to a first aid provider but also has some responsibility to act. A designated first aider is typically found in a workplace; however, their primary responsibility is not first aid.	First aid education and typically some context-specific training; typically, skills are refreshed and retrained regularly and they have opportunities to practise with some regularity. Contact EMS to request care if required and provide first aid according to training. Document the care provided.	Provide care for a chemical burn according to the specific Material Safety Data Sheets (MSDS) in the workplace. Removal of fishhooks from an injured person's arm.

Other roles in providing medical care

There are other roles that provide medical care. These are often referred to collectively as advanced care. They include:

First responder

- A first responder has a professional responsibility to respond as a primary role of their position.
- First responders are often dispatched by a central organization and are directed to the incident; they are typically the first step in a formal emergency medical service.

Paramedic

- A paramedic provides advanced care according to their profession in varied environments.
- A paramedic may be the first responder to arrive in an emergency.
- A paramedic can often provide sufficient care for the person to return to their activities; however, a paramedic also provides transport services to other health services as required (e.g. hospital).

In-hospital care

- In-hospital care refers to the services provided by doctors, nurses and other healthcare professionals who deliver emergency care within the hospital setting. Those providing in-hospital care work in a controlled environment with access to all required tools and professionals available.

Other terms used frequently in these Guidelines

CPR	Cardiopulmonary resuscitation
CEBaP	Centre for Evidence-based Practice (Belgian Red Cross–Flanders)
ICRC	International Committee of the Red Cross
IFRC	International Federation of Red Cross and Red Crescent Societies

ILCOR	International Liaison Committee on Resuscitation
The Movement	The Red Cross Red Crescent Movement

Using the Guidelines 2025

Because this document is extensive, it is encouraged to use its built-in navigation features to move efficiently between sections.

- Key topics are linked throughout the guidelines to help readers make connections across content; for example, CPR is generally linked to the topic on unresponsiveness and abnormal breathing for adults and adolescents, with a clear cross-link to the child and baby topic.
- An easy-to-access table of contents on the inside cover allows quick navigation to guideline chapters.
- The topic index offers a more comprehensive way to locate specific subjects across contexts and populations.
- The gear icon (⚙️) at the bottom of even-numbered pages provides direct access to the topic index from anywhere in the document.
- Referencing is integrated through in-text citations in parentheses throughout, with a consolidated reference list at the end of the document, organized into four sections for ease of use: Contextualizing first aid and first aid education, First aid education, First aid and Resuscitation.

Future development

These Guidelines are not exhaustive. For this edition, topics requested by National Societies and others considered current and relevant have been included. First aid topics that were not reviewed have been excluded from this list. National Societies are invited to reach out to the Global First Aid Reference Centre if there are topics for which they need an evidence base to be considered for future analysis.

Process to develop the 2025 Guidelines

Red Cross and Red Crescent National Societies independently developed their national guidelines for many years. Since 2011, the IFRC, through the Global First Aid Reference Centre, has published evidence-based international guidelines drawing on the best available science and practices from the field.

In 2022, following the successful adoption of First Aid Vision 2030 at the General Assembly, the Global First Aid Reference Centre began the process of updating and developing the *International first aid, resuscitation and education guidelines* 2025. This process included recruiting subject matter experts and conducting a needs analysis with first aid education programme developers to determine priority topics. The Steering Committee established a structured process for conducting evidence reviews and cataloguing evidence-based practices.

Evidence-based guidelines

Approach to the development of evidence-based guidelines

The Guidelines are developed in accordance with the principles of evidence-based practice. Evidence-based guidelines integrate three key sources of information:

1. The best available scientific evidence, identified and collected through systematic database searches.
2. Practical experience and expertise contributed by experts in the field.
3. Preferences, values and available resources of target groups, such as first aid providers and people receiving first aid, to ensure recommendations are relevant and feasible.

The Steering Committee began by selecting the topics to be included in the Guidelines. In addition to the existing topics, one new topic, anxiety and panic, was identified for inclusion. For each topic, the Committee systematically collected up-to-date evidence.

As a leader in first aid, resuscitation and education science, the IFRC network has traditionally worked in partnership with local resuscitation councils and their parent organizations. In 2024, the IFRC became an official Collaborating Member with the International Liaison Committee on Resuscitation (ILCOR) and formally contributed to the Consensus on Science and Treatment Recommendations. For the 2025 Guidelines, ILCOR publications from 2020 to 2025 were consulted for topics relevant to the IFRC. In addition, evidence summaries developed by the Centre for Evidence-Based Practice of the Belgian Red Cross–Flanders were updated between 2023 and 2025.

Where an evidence summary was considered stable, meaning the evidence was of high certainty or the intervention was widely accepted as common sense and supported by existing evidence, no further updates were undertaken.

Education topics followed a similar development process. With input from first aid educators and the Steering Committee, the list of education topics was revised by consolidating previous topics and developing new ones to respond to the needs of first aid educators across the International Red Cross and Red Crescent Movement. Evidence summaries were updated through a systematic review process. A total of 5,295 manuscripts identified through systematic

searches related to first aid and first aid education were sorted by topic. Two to three first aid education experts from diverse global regions synthesized the relevant studies to inform the updated Guidelines.

Based on the updated evidence, draft recommendations were revised as needed. Monthly conference calls were held to monitor progress. Each topic was developed collaboratively by members of the clinical and education working groups.

Clinical topics were reviewed by the clinical working group, after which educational considerations were added through a review of education-focused literature and expert input. Topics were framed using the chain of survival behaviours. Reviewers with expertise from both high- and low-resource settings were consulted. For topics particularly relevant to conflict settings, reviewers from the ICRC provided expert input and additional literature insights. ILCOR members also reviewed topics aligned with ILCOR publications to ensure consistency.

Engagement and contextualization

In spring 2025, an Engagement Committee was established to support the contextualization of the Guidelines. This committee included 66 participants from all five IFRC Regions–Africa, Americas, Asia-Pacific, Europe and Middle East-North Africa–and met eight times over three months to review 24 topics. More than 500 recommendations were considered for inclusion. Recommendations were incorporated into education considerations and chain of survival behaviours to support local implementation.

Use of generative artificial intelligence

ChatGPT (GPT-5) was used as a language-support tool to promote consistency and clarity throughout the document. It supported synthesis of contributions from multiple volunteer authors and organizations and alignment of terminology. The use of generative AI reflects emerging, accepted practices in the humanitarian sector to responsibly apply digital tools that enhance collaboration, inclusivity and efficiency, while maintaining human oversight, transparency and ethical standards. All content refined using generative AI was reviewed, edited and verified by human authors to ensure accuracy, clarity and fidelity to the intended meaning. Generative AI was used specifically to support the development of the 2025 Guidelines front matter, Evidence to action, Contexts and Education sections.

Structure of the Guidelines

Significant effort was made to clearly link recommendations to first aid education. Each topic now includes expanded content to support programme designers in developing confident and capable first aid providers. Education is emphasized as the primary mechanism for building ability and confidence, reflected in the inclusion of education in the Guidelines title.

Each topic includes:

- Key action
- Introduction
- Guidelines and good practice points (GPPs)
- Chain of survival behaviours
- Education considerations

- Scientific foundation

These sections build sequentially from the scientific foundation. While organized for practical use by programme designers, they function as interconnected building blocks:

- Scientific foundation establishes the evidence base.
- Guidelines are derived from the scientific foundation. Good practice points are derived from non-systematic reviews and expert experience to supplement where evidence is not available.
- Key actions and chain of survival behaviours are derived from the Guidelines and good practice points.
- Education considerations support programme development based on key actions and chain of survival behaviours.

Scientific foundation and education evidence

Recommendations are informed by the ILCOR scientific reviews up to 2025, CEBaP evidence summaries, independent scientific reviews and expert opinion.

Education evidence was guided by two research questions:

1. In laypeople, how do different first aid learning modalities compare in terms of patient, learner, and societal outcomes?
2. What factors influence implementation of first aid education interventions across different target groups?

Inclusion and exclusion criteria

Included studies focused on first aid education, chain of survival behaviours, lay responders (e.g. Red Cross Red Crescent staff or volunteers), bystanders, and contextual inputs (e.g. disaster, conflict, health crisis). Excluded studies focused on healthcare professionals or advanced instructor training. Where evidence was limited or absent, expert consensus informed good practice points.

First aid topics

In each topic, a summary of the scientific foundation is provided. The following evidence sources were included:

- Up-to-date evidence summaries by CEBaP (updated between 2023 and 2025); all summaries are available via registration to the CEBaP First Aid Evidence Summary Database.
- Systematic reviews conducted by ILCOR; we refer to the ILCOR Consensus on Science with Treatment Recommendations publication or to separately published ILCOR systematic reviews in the reference list of the topics. Other relevant systematic reviews are identified by the topic contributor.

The findings of these existing evidence sources are summarized under the sub-heading Systematic reviews. The overall quality of the evidence ("certainty of evidence") was taken over from the original evidence sources. In addition, a sub-heading Non-systematic reviews is provided for many topics. The paragraph contains additional expert opinion or findings based on

individual studies or other sources of information. These sources of information were gathered in a non-systematic way, and were used to formulate the good practice points (i.e. recommendations where no systematically identified evidence is available, but which are “common sense” and there is consensus among the involved reviewers).

In addition to rigorous review by experts in the field, all topics drawing on evidence from ILCOR have been reviewed to ensure alignment with the ILCOR Consensus on Science with Treatment Recommendations. While the Guidelines also incorporate expert input and context-specific considerations, this review process ensures that no content contradicts ILCOR publications.

There are differences between the recommendations of the guidelines for cardiopulmonary resuscitation (CPR) in adults and children and for airway clearance.

These differences are mainly based on:

- different methodological choices
- distinct cultural and organizational contexts
- varying interpretations of the same scientific data (ILCOR).

In addition, most of these differences depend on access to emergency services, which varies considerably, requiring for some simple and immediate actions with rapid transfer to hospital, and for others immediate actions while waiting for advanced paramedical or medical teams to arrive, allowing for more precise and prioritized interventions.

Guidelines and good practice points

Guidelines were developed by weighing evidence quality, benefits, harms, risks, preferences and contextual factors. Recommendations are classified as strong (**), weak (*), or good practice points , with implications for practice clearly defined.

Strength of guideline	Description and strength of evidence	Implications
** Recommendation terms: must/should (or must/should not)	• A strong recommendation. • Benefits strongly outweigh the harms. • This recommendation is the most appropriate action.	• Must be followed unless a clear and compelling rationale for an alternative approach is present.
* Recommendation terms: may, could (or not recommended)	• A weak recommendation. • Benefits and risks and burdens are finely balanced or appreciable uncertainty exists about the magnitude of benefits and risks. • There is some uncertainty regarding the most appropriate action and different choices can be appropriate.	• Prudent to follow, but one should remain alert to new published evidence that clarifies the balance of benefit versus harm.
GPP Good practice point terms: can also contain active wording such as should, must.	• Based on common sense, good practice or (very) low-quality evidence, expert opinion, etc. • An important practical point for which the expert panel reaches a consensus, and nobody is likely to question it.	• A good practice point is based on common sense and consensus, however, could be sensitive to context.

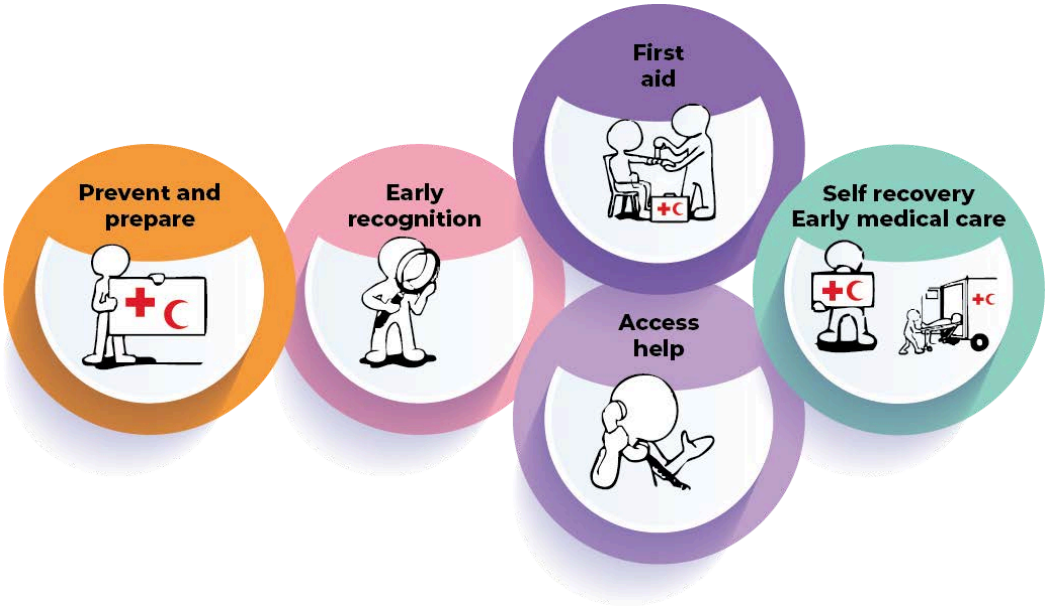
Where no clear evidence was available or missing, but clinical practice or expert opinion is available, good practice points were formulated based on the experience of National Red Cross Red Crescent Societies or based on the non-systematic review sources provided in the scientific foundation.

Key action

The key action describes the most important action related to the topic. For education topics, it highlights the key takeaway for programme designers in relation to the education modality. For first aid topics, it identifies the key action that programme designers should emphasize to learners. Inclusion of the key action supports the development of training and educational materials.

Chain of survival behaviours

Each topic is considered through the domains of the chain of survival behaviours. These domains represent the most effective actions to prevent, recognize or treat an illness or injury, based on the scientific foundation and the guidelines. They are presented as instructional steps; however, adaptation may be required to reflect different contexts.



For example, where first aid providers are unlikely to have access to specific first aid equipment (such as clean water), appropriate alternatives should be used. Educators should emphasize the importance of applying all feasible first aid actions to reduce pain, suffering and further harm, even when it is not possible to apply every step in a given context or situation.

Education considerations

Education considerations describe how location, environment, access to resources and other contextual factors may influence how a topic is taught. These considerations are informed by a combination of evidence (where a systematic review has been conducted and referenced) and expert opinion. Elements may include:

Context considerations	• Describe how location, environment, access to resources and other local factors may influence how a topic is taught.
Learner considerations	• Describe factors that programme designers should consider in relation to learners. • Identify and recommend strategies to reduce barriers to providing first aid. • Identify relevant social norms associated with the topic and strategies to respect those norms while providing first aid.
Facilitation tips and tools	• Identify teaching approaches, adaptations and key points to emphasize in order to strengthen learning. • Highlight common training gaps or missteps. • Suggest tools to support effective training.
Learning connections	• Identify links to other first aid topics or broader concepts of care.

ICRC involvement

The International Committee of the Red Cross contributed significantly to the Guidelines, providing expertise in first aid delivery and education in conflict and low-resource settings. The Guidelines reflect the ICRC's emphasis on safety, contextual adaptation, trauma-informed care and learner-centred education. They aim to harmonize education approaches across National Societies and conflict and non-conflict settings while allowing for contextual adaptation.

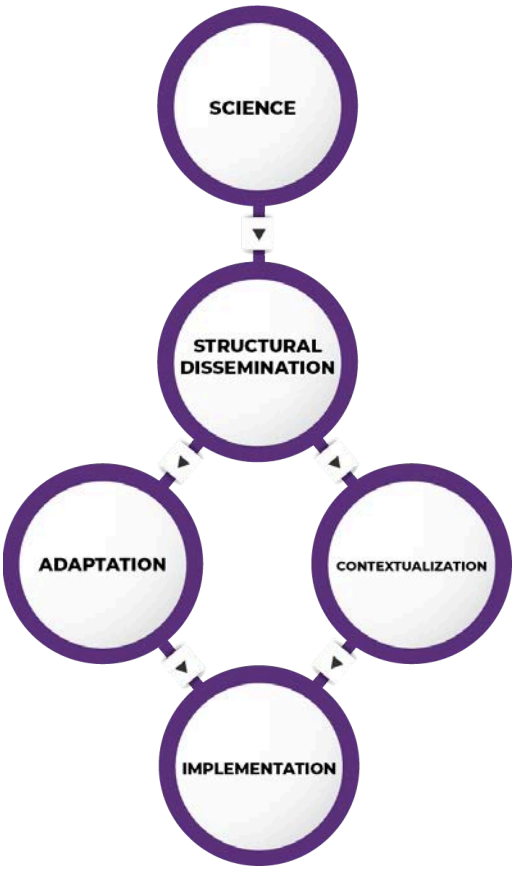
CONTEXTUALIZING FIRST AID AND FIRST AID EDUCATION

Evidence to action

In line with the First Aid Vision 2030 (IFRC, 2022), this framework helps National Societies turn evidence into action using methods that are universal, inclusive and rooted in humanity. It recognizes that first aid is both scientific and compassionate—driven by evidence, carried out by people and shaped by diverse contexts. Through adaptation, contextualization and implementation, we ensure first aid education remains relevant to ever-changing needs while helping communities strengthen their resilience.

When using these Guidelines, National Societies should consider local risk factors, healthcare systems and capabilities, public health culture and legislation related to first aid. Common health concerns and injuries identified by specific communities or target groups must be addressed with attention to cultural and religious beliefs, available resources and patterns of vulnerability.

Where possible, this process should be undertaken with the National Society's scientific advisory group (or equivalent). Ideally, this group includes education experts, medical experts, researchers, first aid educators and local community representatives. Partnerships with public authorities, academic institutions and other National Societies can further enhance the process and promote shared learning.



From evidence to action

Shifting the Guidelines from evidence to action consists of three elements:

1. Adaptation: Recognizing the different personal, community, regional and national factors that influence both an educator's ability to provide first aid education and an individual's ability to deliver care.
2. Contextualization: Matching recommendations to the unique environments in which National Societies operate, including the exposure to various types of risks and settings with differing access to resources or medical support.

   See the Contexts section of the Guidelines for more information on this element.

3. Implementation: Transforming evidence into sustainable educational programmes that equip learners to act confidently and effectively.

These three elements impact each other. Adaptation informs contextualization, which in turn supports effective implementation.

This framework provides National Societies with a structured approach to examine and adapt their first aid education programmes. Its application at both national and local levels should be reviewed periodically to ensure ongoing relevance and effectiveness, as evidence, resources and community needs evolve.

Adaptation

Over the past three decades, the Red Cross and Red Crescent Movement has worked to anchor its Guidelines in the best available scientific evidence. Drawing on contributions from specialized experts across the Red Cross and Red Crescent Movement and the wider emergency medicine community—such as the Centre for Evidence-Based Practice of the Belgian Red Cross and the International Liaison Committee on Resuscitation—this approach ensures that first aid recommendations are grounded in robust evidence and sound educational principles.

At the same time, first aid does not exist in a legal, cultural or economic vacuum. Actions considered permissible or appropriate in one context may be restricted or interpreted differently in another. For example, national regulations governing the administration of medications, oxygen or the use of automated external defibrillators (AEDs) by lay responders vary widely, as do the human, systemic and financial resources available to support first aid delivery.

Accordingly, National Societies are encouraged to interpret and adapt these Guidelines in line with national legislation, cultural practices and local health system structures, while remaining faithful to the underlying evidence and the Fundamental Principles of the Red Cross and Red Crescent Movement. These International Guidelines are intended to serve as both a common framework and a living resource, supporting National Societies in the design and continuous improvement of first aid education, training and outreach. Guideline authors are also encouraged to use the evidence base to inform dialogue and advocacy for policy or legislative changes where this may help expand access to safe and effective first aid.

In a diverse world, uniformity is neither possible nor desirable. The shared aim is therefore greater harmonization through evidence-based, context-sensitive guidance that strengthens the global impact of first aid while respecting local realities.

Adaptation begins with understanding local factors—individual, community, regional or national—that shape first aid delivery. These factors are interconnected and influence one another. Identifying them allows programme developers to consider how best to approach complex realities using the Guidelines.

Strength of guideline	Description and strength of evidence	Implications
Individual	• Values, ethics, and moral imperatives; health risks; individual preferences.	• How do individuals identify with their communities? What matters most to them? What are their most common risks and priorities?

Strength of guideline	Description and strength of evidence	Implications
Community	• Cultural norms; prevalent risks; available resources; and access to care.	• What beliefs may influence a first aid provider's ability to act? What systems or groups already exist? What resources are available?
National or regional	• Legal and regulatory frameworks; health systems; and dominant industries.	• What laws and regulations affect first aid? How do regional or national systems shape first aid practices (such as in the workplace)?

A PESTEL analysis (examining political, economic, socio-cultural, technical, environmental and legal factors) can help structure this process.

Implementation

Implementation uses the Guidelines to go from planning to actioning a first aid education programme. It involves designing or updating first aid education so that it is effective, inclusive and sustainable. Successful implementation depends on a strong understanding of the Guidelines, thoughtful adaptation to local contexts, and continuous reflection on outcomes. Implementation is not a one-time event—it is a cycle of development, delivery and improvement that strengthens the quality and reach of first aid education over time.

Implementation typically includes several key steps:

1. Learning needs analysis

Identify and describe the learner groups your programmes aim to serve, such as school students, drivers, community volunteers or workplace first aid providers. Assess:

- Contexts of care: Where are learners likely to provide first aid (e.g. at home, on the road, in remote areas, in disaster or conflict settings, along a migration route)?
- Risks and priorities: What are the most common injuries or illnesses they might encounter?
- Resources available: What tools, equipment, or medical support are realistically accessible?
- Learner profile: What skills, knowledge and attitudes are needed to build confidence and competence? What might be the background of the learner to be considered for an effective first aid programme (exposure to traumatic situations, migrants, etc.)? What specific education needs could be related to specific disabilities, for instance?
- Learner preferences: How do they like to learn? What time do they have available?

Gather this information through surveys, focus groups, interviews or community consultations, ensuring that gender, age and cultural considerations are represented. The results inform the design of training that is both relevant and equitable.

2. Programme analysis

Evaluate your existing programmes and materials to identify strengths, weaknesses, opportunities and threats (SWOT analysis). Consider:

- Alignment with the 2025 Guidelines and current evidence.
- Effectiveness of teaching methods (in-person, blended or digital).
- Accessibility for different learner groups, including those with disabilities or limited literacy.
- Trainer readiness and support systems.

Use this analysis to inform your prioritization of updates or redesigns. Where possible, engage learners and instructors in reviewing what works well and what needs improvement.

3. Programme development

Use what you uncovered from the analysis to create effective products and activities:

Revise curricula and lesson plans to reflect the most relevant topics, scenarios and examples.

- Select delivery methods that meet learners' preferences, such as interactive workshops, community-based demonstrations, simulations or online modules.
- Use inclusive education practices, create materials that are culturally sensitive and accessible in multiple formats and languages.
- Plan for sustainability, including cost-recovery models, partnerships and mechanisms for regularly updating materials and trainer skills.

GFARC is a resource available to support National Societies in developing and contextualizing first aid programmes. Visit the GFARC website for more information.

4. Communication

Clear and honest communication supports trust, alignment and consistency across the Movement.

- Inform trainers, volunteers and partners of programme updates and new evidence.
- Develop a communication plan to share key changes, emphasizing the rationale behind revisions and how they improve outcomes.
- Access internal networks (newsletters, learning platforms or ToT forums) to share success stories and lessons learned.

Regular communication reinforces the unity and credibility of first aid education within and across National Societies.

5. Evaluation and continuous improvement

Evaluation ensures that first aid education remains responsive and effective.

- Monitor learner outcomes: Collect feedback through post-training surveys, assessments or community follow-ups.
- Measure programme impact: Track indicators such as learner confidence, knowledge retention and community reach.
- Review and revise: Use evaluation data to update content, teaching methods and trainer development.

Consider using an outcomes evaluation toolkit or a similar framework to structure data collection and analysis. Schedule regular reviews every two to three years or after major contextual shifts or international Guidelines publication to keep the programme relevant.

Practical tools such as SWOT, PESTEL and outcomes evaluation frameworks can support National Societies throughout these steps. Guidance, templates and mentoring are available through the IFRC Global First Aid Reference Centre at first.aid@ifrc.org.

National Societies are encouraged to engage with the International First Aid Attestation (IFAA) programme (Global First Aid Reference Centre [GFARC], n.d.-a) to develop effective evidence-based first aid education programmes that are inclusive, contextually appropriate and consistent with the Guidelines. The IFAA provides tools to assess quality and compare training standards to help National Societies align their first aid courses with the Guidelines and demonstrate accountability, consistency and excellence in first aid education. The IFAA programme continually assesses and works to improve the quality of the National Societies' first aid training courses, as well as recognize the quality in the local first aid training market.

The international Training of Trainers (ToT) programme (Global First Aid Reference Centre [GF ARC], n.d.-b) offers structured pathways for developing skilled, reflective and adaptable educators (trainers of trainers and trainers). Trainers who complete ToT programmes are equipped to apply within their National Society learner-centred methods, promote inclusion and ensure alignment to the Guidelines. These educators are essential in translating evidence-based recommendations into effective, compassionate learning experiences that build confidence and competence in every learner.

Complementing this, the Universal First Aid App (Global First Aid Reference Centre [GFARC], 2023) is a pioneering mobile application designed to spread worldwide essential knowledge on first aid, safety and preparedness, Epidemics and Psychological First Aid. This multifaceted app is an appropriate tool to help learners maintain their knowledge and skills after first aid training. The App can be adopted and contextualized by all National Societies around the world.

A living framework

The process of adaptation, contextualization and implementation is cyclical and reflective. National Societies are encouraged to revisit these stages regularly as part of their ongoing commitment to excellence, inclusivity and humanitarian service.

By continuously adapting, contextualizing and implementing the Guidelines—and through engagement with global initiatives such as the International First Aid Attestation and the Training of Trainers programme—National Societies help ensure that first aid remains a universal act of humanity—driven by evidence, practical and accessible to all.

Understanding contexts for first aid care and first aid education

First aid is shaped by the environments, risks and realities of the people who give and receive it. Recognizing this, the International Red Cross and Red Crescent Movement defines a range of contexts for providing both first aid care and first aid education. Context determines how people learn, act and adapt when providing life-saving support. For programme designers, understanding context is essential for tailoring education, ensuring relevance and upholding the Movement's commitment to making first aid accessible to everyone, everywhere.

The concept of context can be understood along two intersecting dimensions:

1. Locational contexts, which describe *where* first aid takes place, ranging from remote to urban environments.
2. Situational contexts, which describe *what is happening*, the specific circumstances or events that need first aid, such as disasters, armed conflict, workplace incidents, migration or public health emergencies.

These dimensions are interrelated. A situational context—such as a natural disaster or health epidemic—can occur anywhere along the locational continuum. For instance, an urban disaster like Hurricane Katrina in the southern United States and a remote earthquake in Nepal both pose unique challenges for first aiders, yet both demand the same core humanitarian commitment: to save lives, reduce suffering and promote recovery through resilience.

Locational contexts: the remote–urban continuum

Locational context refers to *geographical and infrastructural* conditions, including the distance from advanced medical care, population, available resources and communication or transport systems. It affects both the likelihood of certain emergencies and the strategies for responding to them.

Remote or isolated settings are characterized by long distances to hospitals, limited communication and minimal medical infrastructure. In these environments, first aiders often provide extended care, stabilizing patients for hours or even days. Remote contexts also include isolated islands, deserts, mountain regions and polar environments. National Societies operating in these areas often combine first aid training with broader survival skills, community preparedness, and telemedicine partnerships.

Urban environments feature higher population densities, faster access to hospitals and more formal emergency services—but also present new challenges, including crowd dynamics, traffic congestion and complex infrastructure. The COVID-19 pandemic showed that even in high-resource urban settings, access can collapse rapidly.

Urban programmes prioritize coordination with emergency medical systems (EMS), mass-casualty management and psychosocial support. They must also prepare learners for infrastructure breakdowns that temporarily blur the line between urban and remote.

Situational contexts: circumstances that shape first aid delivery

Situational contexts describe the specific *conditions or events* in which first aid is required. These can occur anywhere along the locational continuum. For example, a health epidemic may affect both remote villages and urban neighbourhoods differently at the same time.

Situational context	Description	Example
Disaster	Disasters—whether natural or human-made—disrupt normal systems and amplify risk. They often combine injuries, psychological trauma and loss of infrastructure.	The 2015 Nepal Earthquake When a magnitude 7.8 earthquake struck Nepal, remote mountain villages were cut off for days. Community-based first aid providers trained by the Nepal Red Cross Society provided wound care, splinting and emotional support long before outside help arrived. In contrast, in Kathmandu, urban providers faced collapsed buildings and overwhelming casualty numbers, requiring triage and coordination with limited resources. Education for disaster contexts prioritizes situational awareness, mass-casualty triage, improvisation and self-care for responders.
Conflict	Armed conflict presents ethical, psychological and logistical challenges. Access to care may be limited by insecurity, damaged infrastructure or restrictions on movement. First aiders in these settings must balance duty of care with personal safety and neutrality.	Syrian Arab Red Crescent Operations During the Syrian conflict, volunteers provided first aid under shelling and in besieged areas. Training focused on bleeding control, safe evacuation and psychological support—adapted for high-risk, low-resource conditions. In such contexts, education must include protection principles, stress management and coordination with humanitarian law.
Workplace	Workplace contexts vary widely from corporate offices to offshore platforms and construction sites. Risk profiles vary depending on occupation, environment and access to care, and first aiders often have a legal responsibility to provide care.	Remote worksite in the Canadian North Mining and energy workers often operate far from hospitals, with limited communication. First aid providers must manage fractures, hypothermia or cardiac events during prolonged transport delays. Programmes for remote workplaces combine occupational risk assessment, equipment management and scenario-based practice that recreates real shift conditions.
Migration	Migrants, refugees and internally displaced people often experience hazardous journeys, limited access to health services and psychosocial stress. First aid in this context extends beyond physical injuries to include psychological first	Migration routes across the Mediterranean Red Cross and Red Crescent teams operating on rescue vessels and at disembarkation points provide care for hypothermia, dehydration and trauma. Volunteers also address fear, grief and family separation. Education for this context must highlight compassionate communication, cross-cultural

Situational context	Description	Example
	aid and culturally sensitive support.	sensitivity, and coordination with protection services.
Health epidemic	Epidemics and pandemics demand first aid that integrates infection prevention, psychological support and community resilience.	COVID-19 pandemic The pandemic blurred all contextual boundaries: remote villages faced isolation, and urban hospitals were overwhelmed. National Societies adapted rapidly, using online learning, small-group instruction and risk communication campaigns. This experience emphasized the need for flexible delivery models, digital literacy, and safety protocols for trainers and learners alike.

Recognizing the evidence gap: a high-resource bias

Much of the published research informing global first aid guidelines originates from high-resource, urban, peacetime settings with quick access to advanced care. This creates a knowledge gap when applying evidence to low-resource or unstable environments. Programme designers must therefore interpret and adapt evidence, combining scientific findings with local experience and practitioner knowledge.

For instance, CPR outcomes measured in North American hospitals cannot be directly applied to rural areas without ambulance services. Similarly, wound care guidance based on sterile environments must be reconsidered for settings with limited clean water. Understanding contexts helps recognize these differences and encourages educators to contextualize, not copy, evidence-based practices.

Models for implementing context-adapted programmes

Developing contextual understanding in programme design follows a series of steps:

1. Identify primary contexts
   Map the main locational and situational contexts where your National Society provides education. Use community risk assessments and volunteer feedback.
2. Consider access to advanced care and access to resources
   This helps visualize variations across regions or target groups.
3. Adapt curriculum and methods
   Adjust content, duration and teaching strategies to match the identified context.
4. Develop context-specific scenarios
   Include simulations, role plays and case studies that mirror learners' realities. For example, train community first aid providers to respond to a flood in their village or healthcare staff to handle power outages in hospitals.
5. Evaluate and update
   Collect data and feedback to see how training performs in each context. Revise the matrix periodically as environments and risks evolve.

Common contexts across the Movement

While every National Society faces unique conditions, certain contexts are shared across the Movement:

- Urban settings with strong EMS but diverse populations.
- Rural and remote areas with limited transport and communication.
- Disaster-prone regions, especially those affected by climate change.
- Areas of instability or migration, where neutrality and protection are key.
- Workplace and school environments, where organized preparedness saves lives.

By comparing these shared experiences through the colour matrix, National Societies can exchange learning, strengthen global coherence and adapt innovations for their own contexts.

Conclusion

Context shapes every aspect of first aid and first aid education. The twin dimensions of locational and situational contexts provide a structured way to analyse and respond to the diversity of environments in which people act to save lives.

- No single “typical” first aid context exists. Every environment combines locational and situational elements
- Contextualization is dynamic. An area can shift colours, for example, an urban area (green) may temporarily become orange or red after a major disaster.
- Equity in education. The matrix helps identify where standard evidence-based content (often taken from high-resource settings) needs to be adapted for lower-resource realities.
- Global coherence, local relevance. Using a common matrix across the Movement supports mutual learning while respecting local diversity.

Whether in a remote mining camp, a city struck by disaster or a community on the move, understanding context transforms first aid from a set of techniques into a living, adaptive act of humanity.

First aid across the urban–remote continuum

Locational contexts

The ability to provide and teach first aid depends not only on skill and knowledge but also on context—specifically, how time, distance and resources affect access to advanced care. At one end of the spectrum are settings where advanced care can arrive within minutes–referred to in the Guidelines as urban; at the other are remote or isolated environments where professional support may be days away. Most communities exist somewhere on this continuum between these two extremes.

However, this continuum can change. A person living in an urban centre might experience "remote conditions" during disasters that disable infrastructure, while those in isolated regions may sometimes have improved access due to mobile clinics, industry infrastructure or telemedicine. Understanding this variability is essential to designing both first aid systems and first aid education programmes that prepare people to act effectively, compassionately and safely in their specific contexts (Born et al., 2012; Jayaraman et al., 2009).

The goal of this section is to define what it means to provide and teach first aid across this continuum and offer guidance on how to assess local conditions, tailor responses and manage the complex realities that can occur when advanced care is delayed.

Understanding the continuum: from urban to remote

Urban areas have lots of infrastructure, resources and quick access to medical care. Examples include cities such as Nairobi, São Paulo, Montreal and Bangkok, where hospitals, emergency transport systems and trained health professionals are readily available. There may also be circumstances that might seem remote, but have access to these resources and advanced care which indicates that they could be considered urban from a first aid perspective. The average response time for an emergency call in many urban areas is under ten minutes.

In these environments, the first aid provider's mission is to stabilize the person—providing sudden rescue and care until advanced responders arrive. Common scenarios include road traffic collisions, cardiac arrests in public spaces, or injuries in industrial settings, schools and offices. However, urban first aid can also be complicated by crowd behaviour, traffic conditions or scene hazards such as electricity and structural instability.

Urban first aid education emphasizes recognition, rapid action and coordinated response. Learners are taught how to contact appropriate services, manage safety, provide life-saving care and communicate effectively with responders.

Remote contexts are characterized by delayed access to advanced care, ranging from several hours to several days. Examples include forestry operations in northern Canada, trekking routes in Nepal, mining sites in Western Australia or humanitarian settings in sub-Saharan Africa.

Here, first aid providers often have to keep the person alive and prevent their condition from worsening for extended periods without external support. They may also need to improvise with

limited equipment, protect themselves from environmental hazards and coordinate transport over challenging terrain (Born et al., 2012; Jayaraman et al., 2009)

Within this broad category, distinctions can be made:

Context	Time to advanced care	Typical resources available	Primary focus of first aid
Urban	Minutes	Full EMS, hospitals, clinics, pharmacies	Immediate stabilization
Rural	Hours	Delayed EMS, hospitals, clinics, pharmacies	Immediate stabilization and transport
Remote	< 24 hours	Basic clinics, nursing stations, limited supplies	Life-sustaining care
Deep remote	24 hours–7 days	Field kits, radios, trained first aid providers	Extended care, prevention
Isolated	> 7 days	Minimal supplies, self-sufficiency required	Survival-level principles

This continuum highlights that as one moves further from urban to isolated areas, the responsibility shifts from external responders to local people, and preparedness, improvisation and psychological endurance become even more important (Orkin et al., 2012)

Assessing context: the risk matrix approach

First aid providers and educators can determine where they are on the continuum by assessing two primary factors:

1. Time to advanced care
2. Access to resources and training

Plotting these on a risk matrix helps determine the likely complexity of first aid needed.

		Time to advanced care			
		<1 hour	1-24 hours	1-7 days	>7 days
Access to resources and training	High				
	Moderate				
	Limited				
	Minimal				

- Low: Standard urban first aid; life-saving care opportunity, emphasize communication and safety.
- Medium: Intermediate training; includes transport, environmental hazards.
- High: Advanced training; focus on prolonged care, resource management.
- Very high: Survival-based approach; integrate shelter, food, sanitation and self-care.

Educators and policy planners should use this framework to determine the depth of first aid training and the level of independence required of providers. For instance, a coastal fishing village 12 hours from the nearest hospital might prioritize wound care, infection prevention and boat-based evacuation, while an urban emergency response team in a densely populated city may focus on mass casualty triage, cardiac arrest management and rapid coordination with multiple healthcare facilities.

Providing first aid across the continuum

Preparation and prevention

Preparation is the foundation of effective first aid, particularly as distance from advanced care increases. In urban areas, preparation means knowing emergency numbers, maintaining first aid kits and understanding local health systems. In remote areas, preparation includes pre-trip medical screening, route planning, redundancy in supplies and knowledge of how to signal for help.

Environmental preparation—such as carrying water filters, weather protection and spare medication—is crucial. In a prolonged scenario, "the little things become big things": minor wounds can become infected, dehydration can lead to confusion and cold exposure can trigger hypothermia (Orkin et al., 2012).

Decision-making and problem-solving

As distance from advanced care increases, decision-making becomes more independent. Urban first aid providers are often guided remotely by dispatchers or can expect paramedics to take over quickly. Remote first aiders, by contrast, must make ethical and logistical decisions about priorities, evacuation routes, and when to continue or cease care.

Education for remote contexts should include scenario-based decision training, encouraging learners to think critically and manage uncertainty. Debriefing these scenarios helps normalize emotional responses such as fear or hesitation and builds resilience (Ratner and Katona, 2016).

Focus on care for self and others

The first aid provider's own safety and well-being are essential. Urban providers may face hazards such as traffic or crowds; remote providers may deal with exposure, exhaustion or isolation. Training should include self-care techniques, rest management and recognizing psychological strain.

Care for others must evolve with context. In urban areas, focus is on stabilizing life-threatening conditions. In remote areas, comfort, hygiene and psychological support become equally vital. Preventing infection, maintaining thermal needs (e.g. warming or cooling) and monitoring changes in condition are central tasks during prolonged care. Documentation of care—whether on paper, by radio or digitally—is important for continuity once advanced care is accessed.

First aid education across the continuum

Differentiating educational programmes

Education must reflect the learners' realities. Those living in remote communities—such as Arctic settlements, pastoral regions of East Africa or mountainous areas of Nepal—require community-based training that builds local capacity. Visitors to remote locations, such as hikers or researchers, need shorter, targeted courses that emphasize self-reliance and communication (Born et al., 2012).

Good practice includes:

- Getting local support from government or community organizations before launching programmes.
- Involving learners in curriculum design to ensure cultural and linguistic relevance.
- Selecting community-based first responders through peer nomination (shown to improve motivation and performance) (Kay, 1984; Kay & Myrick, 1982).

Educational focus by context

Context	Educational emphasis
Urban	Scene safety, CPR, AED use, emergency contact, psychological first aid.
Rural	Environmental awareness, transport of casualties, coordination with clinics.
Remote/ deep remote	Prolonged care, infection control, navigation, communication, resource management.
Isolated	Survival principles, sanitation, mental health, managing death, community resilience.

Educational strategies

Remote learners benefit from peer-to-peer and scenario-based learning. Born et al. (2012) and Orkin et al. (2012) demonstrated that role-play, reflection and practical improvisation build confidence more effectively than lecture formats.

Technology offers new opportunities: blended and e-learning models can reach urban learners efficiently (Jahani et al., 2023), while printed or audio-visual materials serve isolated contexts. Flexibility in format ensures inclusivity, especially for communities with low literacy or limited internet access.

Education should also highlight the psychological and moral aspects of remote first aid—preparing learners for the stress of prolonged emergencies and possible death. Integrating mental health first aid, stress management and post-event debriefing supports resilience and reduces burnout (Reavley et al., 2021).

Managing death in remote or isolated environments

Death is among the most challenging realities of remote first aid. When advanced care is inaccessible, first aiders may witness death or need to confirm the end of life. Managing this

moment requires not only technical awareness but also cultural, emotional and ethical sensitivity.

Physical and logistical considerations

Physically, the first aider's responsibilities include ensuring the scene is safe, confirming the absence of signs of life and documenting time and circumstances. In prolonged-care contexts—such as expeditions or remote communities—bodies may need to be preserved until retrieval, requiring protection from environmental factors (heat, animals, insects, water). According to World Health Organization guidelines (World Health Organization, International Federation of Red Cross and Red Crescent Societies & International Committee of the Red Cross, 2016) respectful handling and covering of the deceased should take priority over transport when conditions are unsafe or when decomposition risk is low.

Logistical planning is essential. Remote teams should be aware of legal protocols for contacting authorities, community leaders or spiritual representatives. Communication devices (e.g. satellite phones, radios) should be part of every remote expedition's preparedness plan.

Emotional and psychological considerations

Witnessing death can trigger acute stress, guilt or trauma. Psychological first aid for responders (peer debriefing, rest and access to counselling) reduces long-term distress. Educators should include emotional self-care and coping strategies in all remote first aid courses.

Even in urban settings, bystanders may experience distress after resuscitation attempts. Normalizing emotional reactions and teaching grounding techniques (controlled breathing, focusing exercises) can prevent cumulative stress.

Spiritual and cultural sensitivity considerations

Death care is deeply influenced by cultural and spiritual traditions. In indigenous, nomadic or faith-based communities, rituals may guide handling, burial or communication with families. The first aider must act with respect and humility, following local customs wherever possible and avoiding actions that conflict with spiritual beliefs (Ratner & Katona, 2016).

In multicultural expeditions or workplaces, pre-planning discussions should clarify how death will be handled in accordance with the wishes of participants. Sensitivity to gender, privacy and symbolism (e.g. covering the body, avoiding photography) promotes dignity and reduces community tension.

Ethical and legal considerations

When advanced care is unavailable, ethical challenges arise: whether to continue or cease resuscitation, how to verify death and how to communicate with families. The guiding principles are: do no harm; act within training; and document decisions clearly. Many countries lack specific legal frameworks for remote deaths; however, international humanitarian guidance emphasizes the duty to protect dignity and ensure accurate reporting (World Health Organization, International Federation of Red Cross and Red Crescent Societies & International Committee of the Red Cross, 2016).

Ultimately, training for remote contexts must include a discussion of death—not to instil fear, but to prepare individuals emotionally and practically for a situation that, although rare, profoundly shapes the human aspect of first aid.

Conclusion

Providing and teaching first aid across the urban–remote continuum means recognizing that context determines capacity. In an urban context, systems and speed define effectiveness; in remote regions, planning, endurance and compassion are essential. The continuum is a dynamic spectrum where each context informs the other: urban systems can learn adaptability from remote communities, while remote educators can adopt the structured rigour of urban models.

Assessing one's place on this continuum through factors such as time to advanced care, available resources and workforce capacity enables tailored preparedness. Integrating psychological, cultural and ethical dimensions, especially regarding death, ensures that first aid remains not only technically sound but profoundly humane.

For the IFRC network, embracing this continuum approach affirms that first aid is universal; whether in a crowded city street or a distant mountain pass, it is the same compassionate impulse—to act, to care, and to preserve dignity—that defines our shared humanity.

Workplace

People spend much of their daily lives in the workplace—often more than 35 hours per week—which increases exposure to risk during this time. In many countries, first aid training and preparedness are mandatory components of occupational safety frameworks.

Workplaces exist globally and are highly diverse, ranging from office environments and service industries to construction sites and offshore installations. In all of these, first aid is an essential element of health and safety management. Training and protection are often legal requirements, supported by national or sectoral regulation.

All working people are affected by workplace safety, regardless of occupation or setting. Some sectors—such as construction, manufacturing, agriculture and transport—pose higher risks due to physical demands or exposure to hazardous materials. However, even in low-risk settings, such as offices, medical emergencies such as cardiac arrest, stroke, choking or falls can occur.

Workplaces occur in every setting across the world, including formal and informal sectors, small and large enterprises, and both private and public institutions.

In remote workplaces, such as mining, forestry or oil extraction sites, the organization remains responsible for worker safety and health. Employers must adequately prepare workers with training, supplies and response plans that account for delayed access to advanced care. Individuals should have sufficient materials and knowledge to provide first aid and a clear plan for emergency action.

In urban workplaces, access to emergency medical care is typically faster. Organizations must have a structured emergency response plan that includes trained personnel, designated first aid providers and clear procedures for summoning advanced care.

First aid in the workplace requires particular attention because of its universal relevance, its frequent inclusion in legislation and the diversity of workplace conditions. Accidents and workplace incidents represent a major global health issue. The International Labour Organization (ILO) estimates that more than 2.78 million people die each year from occupational accidents or work-related diseases, and approximately 374 million sustain non-fatal injuries (International Labour Organization, 2019).

Such incidents have far-reaching consequences:

- Human and social: injury, disability or death affecting workers and families.
- Economic: loss of productivity, with an estimated four per cent annual decline in global GDP.
- Legal and reputational: obligations and liabilities for employers.

Recognizing these concerns, at its 110th Session in 2022, the International Labour Conference included “a safe and healthy working environment” in the ILO's framework of fundamental principles and rights at work and designated the Occupational Safety and Health Convention, 1981 (No. 155) and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187) as fundamental conventions. This underscores the importance of embedding first aid within occupational safety and health systems.

At the policy level, initiatives such as the Alliance for Workplace Awareness and Response to Emergencies (AWARE), established in 2024 by the European Resuscitation Council, European Society of Cardiology, European Society for Emergency Medicine (EUSEM), IFRC and others, seek to strengthen legislation and political advocacy for workplace first aid and cardiac emergency preparedness at the European level.

Workplace first aid should be integrated into organizational health safety management policies and informed by the specific hazards of each setting. Competent, accredited training organizations such as National Red Cross and Red Crescent Societies play a vital role in ensuring high-quality delivery and sustainability.

Risks in the workplace

Risks vary according to the workplace but commonly include:

- illness or medical emergencies occurring during work hours
- physical injuries such as falls, cuts, or burns
- exposure to hazardous substances
- stress-related conditions or psychological strain.

What are the highest impact risks?

Major industrial or workplace accidents, particularly in manufacturing, mining or energy sectors, can result in multiple casualties and significant operational disruption. Most workplaces experience more frequent minor injuries, such as strains, cuts, or fainting, yet these can escalate without timely care. These risks highlight the importance of ensuring that training, planning and resourcing are proportionate to each workplace's specific hazards.

Access to first aid resources

A workplace should provide:

- An adequate number of trained first aid providers.
- Suitable, well-maintained equipment for immediate care, such as automated external defibrillators (AEDs). Equipment should undergo routine technical checks and maintenance to ensure readiness.
- Easily accessible first aid kits labelled with the international white cross on a green background.
- At least one dedicated first aid room appropriate for the size of the premises, type of activity being carried out, and frequency of accidents.

The extent and quality of these resources are often reinforced by national legislation, industry standards and partnerships with accredited training organizations, including NationalRed Cross and Red Crescent Societies.

Workplaces should ensure that all staff know where to find first aid supplies and who to contact in an emergency. Larger sites should post signage and maintain centralized records of equipment locations and trained personnel.

Access to advanced care

Access depends on the local health system and workplace location. Organizations must ensure clear procedures for contacting emergency services and transferring casualties to medical facilities. In urban workplaces, advanced care is typically available within minutes. In remote or industrial settings, delays may extend to several hours or days. Employers are responsible for planning around these timeframes and ensuring that interim care can be safely provided.

Considerations for first aid care

To strengthen the impact of first aid in workplaces, stakeholders must link it directly to occupational safety and health (OSH) culture. Legislation varies widely, but common challenges include:

- Limited understanding that first aid can be performed by lay persons.
- Overreliance on nearby emergency medical services in urban settings.
- Inadequate policy inclusion of first aid within OSH frameworks (where applicable).
- Limited enforcement of training requirements or refresher cycles.
- False belief that first aid knowledge is only necessary in high risk environments.

For workers to receive suitable protection:

- First aid must be clearly included within national OSH legislation.
- Training requirements should be appropriate for workplace risk levels and healthcare capacity.
- First aid must be integrated into organizational health and safety management systems.
- Monitoring and enforcement should make sure organizations comply.
- Accredited training organizations must provide evidence-based, best-practice instruction.
- In the absence of national guidance, workplaces should aim for five to ten per cent of staff trained and certified in first aid, with regular refreshers. This should also take into account working shift patterns, site layout, and other considerations that affect how workers are spread across a workplace.
- National Societies and workplace safety stakeholders should engage in advocacy and awareness campaigns to influence legislation and promote a culture of prevention.

First aid as part of emergency response plans

First aid must be included within organizational emergency preparedness. A Medical Emergency Response Plan should define roles, communication channels and resources. It should link to external responders such as fire and ambulance services and align with national legal requirements.

A comprehensive health risk assessment should include:

- chemical and physical hazards (temperature, radiation, vibration, noise)
- risks from handling equipment, machinery, or loads (including slips, trips and falls)
- psychological and ergonomic factors
- geographical and climatic conditions, such as working in tropical or cold areas, humidity)
- food and kitchen hygiene standards

- existing emergency medical services and healthcare infrastructure.

Using this assessment, organizations can identify the number of trained first aid providers required, specify equipment (kits, defibrillators, stretchers), and define clear emergency procedures for communication and transfer.

First aid kits

Workplaces should maintain clearly labelled first aid kits, including defibrillators, in easily accessible locations, with sufficient contents to serve the number of employees and risk profile. Kits must be routinely inspected, sourced and restocked from quality-assured providers.

Considerations for first aid education

Educators should position workplace first aid as an essential component of occupational safety. Training must emphasize both risk identification and appropriate emergency response, linked to the local healthcare and emergency system.

Good practice points

- Engage national OSH authorities and align programmes with local and sectoral regulations.
- Adapt training to specific workplace hazards and contexts (e.g. chemical, mechanical, ergonomic).
- Incorporate online and blended learning where possible to reach more workers.
- Use workplace risk assessments to guide course content, duration and refresher frequency.
- Define clear roles and responsibilities for designated first aid providers.
- Ensure training covers adult first aid and CPR, including defibrillator use; add child and infant modules where relevant (e.g. schools or public-facing workplaces).
- Include legislative awareness and organization-specific procedures.
- Employers should target at least 50% of workers for basic first aid training, ensuring coverage across all shifts.
- Establish a refresher cycle with tools such as posters, newsletters or digital reminders.
- In contexts with limited emergency healthcare, add modules on safe transport and casualty handling.
- Align course scope with evolving best practices and local legal requirements.
- Incorporate mental health first aid for long-term well-being and workplace resilience (Reavley et al., 2021).
- Celebrate the World Day for Safety and Health at Work (28 April) through open days, demonstrations and awareness campaigns.

Learner considerations

- Informal and mobile workers may need flexible, community-led engagement or short, modular learning (de Aquino et al., 2016).
- High-visibility workers such as drivers, security personnel or transport staff should be prioritized for training as part of community resilience programmes (Jayaraman et al., 2009; Tiska et al., 2004).

- Motivation varies; incentives such as recognition or certification can improve participation (Pellegrino & Asselin, 2020).
- Blended and e-learning models can accommodate scheduling and learning preferences (Mancini et al., 2009; Oliver et al., 2020).

Training providers should ensure inclusive access, using visual materials, scenario-based exercises and peer learning to maintain engagement and confidence.

Agencies for additional information

Key international agencies for workplace first aid policy and implementation include:

- Ministries of Labour or Occupational Safety and Health authorities.
- International Labour Organization (ILO).
- International Commission on Occupational Health (ICOH).
- European Resuscitation Council and Alliance for Workplace Awareness and Response to Emergencies (AWARE).
- National Red Cross and Red Crescent Societies.

Disaster

Situational context

Disasters—whether caused by nature, technology or people—are some of the hardest and most unpredictable contexts for first aid. They can damage or destroy the systems that keep people safe and healthy, such as hospitals and roads. This can overwhelm emergency services, cut off communities and cause serious problems for many people. Unlike workplace or remote settings, disasters are systemic crises that affect everything at once—the place, the responders and the victims.

The World Health Organization (2019) defines a disaster as a serious disruption of the functioning of a community or society that exceeds its ability to cope using available resources. This definition highlights the central challenge for first aid: the growing gap between immediate need and access to advanced care.

First aid in disaster contexts is not only a matter of providing medical assistance—it is also about empowering communities with knowledge, confidence and resilience before disaster strikes. This section outlines how to provide and teach first aid in disasters, including contextual understanding, preparedness, psychosocial care and coordination across systems.

Understanding the disaster context

Nature and scope of disasters

Disasters can be brought on by a variety of hazards that can be categorized as natural, such as earthquakes, floods, wildfires, hurricanes or droughts; technological, such as chemical spills or structural failures; or human-induced, including conflict or terrorism. Increasingly, they are cascading events—a single hazard triggering multiple crises. For example, an earthquake may rupture gas lines, causing fires, or floods may spread waterborne disease outbreaks (Johnston et al., 2014).

Globally, the frequency and intensity of disasters are increasing due to climate change, urbanization and environmental degradation (World Health Organization, 2019). This means more communities—both urban and remote—are being affected in diverse ways.

Urban disaster contexts

In urban environments, disasters can be more severe due to higher populations, complex infrastructure and social inequality. High-rise buildings, busy roads and industrial areas can become dangerous when damaged. In cities like Port-au-Prince (2010 earthquake) and Manila (2013 Typhoon Haiyan), first aid providers faced challenges such as:

- collapsed structures creating crush injuries and trapping people (Bazeli et al., 2017)
- blocked roads preventing access to advanced care
- electric and gas hazards, particularly after earthquakes or explosions
- large-scale displacement and crowd management in shelters or temporary camps
- limited water and sanitation, increasing infection risk (Wilson et al., 2005).

Urban disasters are especially hazardous for people living in informal settlements or without access to transport, as evacuation becomes more challenging. This may result in additional injuries and losses.

First aid in urban disasters focuses on triage and stabilization, where responders must manage high casualty numbers with limited space, light and safety.

Remote disaster contexts

In contrast, remote environments deal with the challenges of distance and delay. When disasters strike isolated regions, such as earthquakes in Nepal's mountain districts (2015), droughts in the Horn of Africa or cyclones in the Pacific, help may take days to arrive.

Key considerations include:

- Prolonged care: first aiders must provide extended first aid for injuries, burns or fractures without advanced equipment.
- Environmental exposure: heat, cold, altitude or flooding can worsen injuries.
- Limited communication: power loss or lack of cell towers impedes coordination.
- Community reliance: local people become first responders, often improvising care with household materials (Orkin et al., 2012).

Remote disasters highlight the need for local resilience—training lay people, strengthening community leadership and pre-positioning supplies.

Comparing urban and remote considerations

Aspect	Urban disaster	Remote disaster
Access to advanced care	May exist but often overwhelmed; hospitals and emergency medical services (EMS) damaged or flooded with casualties	Severely delayed or absent; may rely on community-based responders
Infrastructure	Collapsed buildings, blocked roads, broken utilities	Minimal infrastructure, may become impassable or cut off
Population density	High; crowd control and triage critical	Low; evacuation and isolation challenges
Common injuries	Crush injuries, burns, inhalation, lacerations	Environmental injuries, dehydration, infection, exposure
First aid focus	Rapid triage, airway and bleeding control, coordination	Prolonged care, prevention of deterioration, psychological support

Understanding these distinctions helps educators and responders to adapt training, resources and response plans appropriately.

Assessing disaster risk and preparedness

Preparedness begins with contextual risk assessment, balancing hazard likelihood with local capacity. The IFRC and the Global Disaster Preparedness Center (GDPC) advocate a hazard-impact-capacity approach: identifying what can happen, who is most at risk and how the community can respond.

A hazard-impact matrix helps visualize likely events and responses:

Hazard type	Immediate impacts	Common injuries/illnesses	First aid priorities	Preparedness measures
Earthquake	Building collapse	Crush injuries, fractures, bleeding, dust inhalation	Airway management, bleeding control, immobilization	Identify safe zones, secure heavy objects
Flood	Rapid water rise, contamination	Drowning, hypothermia, skin infections	Rescue breathing, rewarming, wound hygiene	Evacuation routes, clean water storage
Fire / explosion	Burns, smoke inhalation	Burns, respiratory distress, shock	Cooling burns, airway support, evacuation	Fire safety drills, extinguisher training
Drought	Water scarcity	Dehydration, heat illness	Oral rehydration, temperature regulation	Stock safe water, drought-resistant crops
Chemical spill	Toxic exposure	Eye irritation, chemical burns, respiratory distress	Decontamination, scene safety, airway management	Know local industrial hazards
Epidemic / pandemic	Infectious spread	Fever, respiratory illness	Isolation, hygiene, personal protective equipment (e.g. use of a mask)	Public health education, vaccination

The matrix supports community preparedness planning, making sure that education and resources align with local hazards. Preparedness must include vulnerable populations—children, older adults, and people with disabilities—and prioritize equitable access to information and supplies.

Providing first aid in disasters

Safety and scene management

Safety remains the first principle. Disasters often create unstable environments, including aftershocks, debris, downed power lines and toxic materials. Providers should ensure their own safety before providing care and continuously reassess risks (Jacobs et al., 2016).

In urban collapses, rescuers must avoid entering unsafe structures without proper assessment. In remote areas affected by landslides or floods, environmental awareness and personal protective equipment (e.g. gloves, boots) are crucial for preventing secondary injuries.

Common injuries and illnesses

The pattern of injuries in disasters depends on the hazard:

- Crush injuries and fractures are common after earthquakes and building collapses (Johnston et al., 2014). These may lead to compartment syndrome, which requires pressure relief and close limb monitoring.
- Cuts, grazes and puncture wounds from debris are widespread and can become infected, especially when cleaning resources are limited.
- Burns and poisoning result from fires and explosions, requiring immediate cooling and airway monitoring (Loftus et al., 2018).
- Drowning and hypothermia follow floods and tsunamis (Wilson et al., 2005).
- Heat exhaustion and dehydration occur during droughts or prolonged exposure, particularly in humanitarian camps.
- Breathing difficulties and diarrhoeal diseases often occur during the recovery phase due (Wilson et al., 2005) to overcrowding and contaminated water (World Health Organization, 2019).

Understanding these patterns allows responders to prioritize care between controlling bleeding, managing shock, maintaining body temperature and preventing infection.

Triage and resource allocation

In multiple-casualty situations, triage helps direct limited resources where they are most effective. Methods such as START (Simple Triage and Rapid Treatment) are adaptable for low-resource environments (Cicero et al., 2018). Responders classify victims based on breathing, circulation and consciousness, focusing their efforts on those most likely to survive.

Ethically, triage decisions can be distressing. Training must include psychological preparedness for making and accepting such decisions (Bazeli et al., 2017).

Improvisation and adaptation

When supplies are destroyed or inaccessible, improvisation saves lives. Clothing can become bandages, boards can be splints and clean water from bottles can irrigate wounds. Loftus et al. (2018) and van Romburgh et al. (2019) emphasize that improvisation training builds creativity and confidence.

However, improvisation must not compromise safety. For example, defibrillators should not be used in standing water. Education must reinforce an understanding of the underlying first aid principles, so that providers can adapt methods safely.

Coordination and communication

Disasters blur organizational boundaries. First aid providers should coordinate with emergency agencies, local authorities and community networks. Governments may deploy mobile hospitals, while humanitarian agencies like the IFRC operate field clinics and reunification services.

When communication systems fail, local radio, satellite phones and messenger networks become vital. Including these backup tools into preparedness plans ensures continued communication when conventional systems collapse.

First aid education in disaster contexts

Preparedness through education

Education is the foundation of disaster readiness. Communities that understand local hazards, practise drills and maintain preparedness kits respond faster and recover more effectively (Salita et al., 2019).

Disaster first aid education should aim to:

- Develop self-efficacy and confidence to act (Ejeta et al., 2015).
- Emphasize local relevance, referencing the hazards learners are most likely to face.
- Promote prevention, including hygiene, shelter safety and mental health.
- Encourage household and community preparedness, such as emergency plans and communication strategies.

Effective training modalities

Evidence supports blended, community-centred learning. Combining demonstrations, drills and peer discussions helps learners retain skills under stress (Mohamed-Ahmed et al., 2015). Simulation exercises, such as “Disaster days,” create realistic challenges, encouraging teamwork and improvisation (Wilkerson et al., 2008).

Where access to in-person training is limited, mobile platforms, radio broadcasts and printed guides can provide life-saving knowledge. The IFRC’s PrepareCenter.org offers open-access resources for community-level education and resilience building.

Community-based and inclusive learning

Training should target pre-existing community groups, such as workplaces, schools and neighbourhood associations, since they naturally operate as response networks. Inclusive design ensures that women, older adults, people with disabilities and marginalized groups are represented.

Periodic refresher training (at least annually) reinforces memory and motivation. Digital tools such as serious games have been shown to improve triage accuracy and confidence (Cicero et al., 2018).

Psychosocial and ethical dimensions

Disasters affect both responders and survivors on a deep emotional and moral level. They may experience acute stress, grief and moral injury. Psychological First Aid (PFA) frameworks, such as

Look, Listen, Link, help first aid providers give compassionate, non-intrusive support and promote stabilization in chaotic environments (World Health Organization, 2011). Training should prepare providers to recognize distress, normalize emotional reactions, and connect individuals with appropriate support systems. Following a traumatic event, peer support between colleagues is important. In cultures where discussing emotion is stigmatized, education must include culturally appropriate coping strategies—such as community gatherings, rituals or spiritual practices—to sustain resilience and collective healing. Ethical dilemmas are inevitable in disaster response; providers may have to make choices about whom to treat first, when to stop resuscitation efforts, or how to balance a duty of care with personal safety. To help navigate these situations, first aid education should include values-based reflection and dialogue on ethical decision-making. Equally important are human factors such as communication, leadership and trust, which are as vital as technical skills. Simulated team exercises and scenario-based learning strengthen coordination, reduce errors and foster psychological readiness under pressure (Hunziker et al., 2010).

Building resilient communities

Disaster resilience depends on preparedness, adaptability and collaboration. When communities integrate first aid education into disaster risk reduction plans, they become stronger and more self-reliant.

Resilience is collective: governments establish emergency systems, humanitarian organizations coordinate response and individuals maintain preparedness plans. Each component strengthens the whole.

The IFRC's Global Disaster Preparedness Center remains a global reference centre for innovation and research, supporting localized strategies for citizen preparedness and emphasizing the vital role of first aid in saving lives when infrastructure collapses.

Conclusion

Disasters expose both vulnerability and courage. When advanced care is unreachable, the capacity of ordinary people to provide first aid determines survival.

In both urban and remote settings, disaster first aid demands adaptability, improvisation and humanity. Integrating context-based education, psychosocial care and ethical reflection prepares communities to act effectively when systems fail.

For the IFRC and its partners, strengthening disaster first aid is not only a technical goal—it is a humanitarian mandate: to empower people everywhere to protect life, dignity and hope, even in the darkest moments.

Conflict

Situational context

Armed conflict creates some of the most complex and dangerous conditions in which first aid is delivered. Today, conflicts increasingly take place in urban and peri-urban environments, where civilians, responders and infrastructure are exposed to violence. At the same time, many conflicts extend into remote, frontier and isolated areas, where access to services is limited and evacuation to advanced care may take hours or days. Unlike sudden-onset disasters or time-limited epidemics, armed conflict is characterized by intentional violence and sustained insecurity, requiring first aid providers to operate under continuous and unpredictable threat.

In conflict-affected settings, first aid is not only a health intervention but a life-preserving humanitarian act, often delivered under direct threat. Responders must balance the urgency of life-saving care with continuous assessment of security risks. The ability to adapt care, education, and decision-making to rapidly changing conditions is essential.

For the International Red Cross and Red Crescent Movement, first aid in conflict is grounded in humanitarian principles and closely linked to broader efforts to protect civilians, ensure access to care and support community resilience.

Characteristics of conflict-affected settings

Conflict settings are defined by persistent insecurity, damaged infrastructure and disrupted health systems. Weapons, tactics and environment shape injury patterns, while access to advanced care is often limited by insecurity, checkpoints or destroyed facilities.

Unlike disaster or epidemic contexts, the threat is often intentional and ongoing. Responders may face direct targeting, secondary attacks or restrictions on movement. This reality profoundly shapes how first aid is provided and taught. Understanding how conflict manifests across the remote–urban continuum is essential for adapting first aid systems, training approaches and expectations of care.

Conflict affects settings differently along the remote-urban continuum:

- **Urban conflict** often involves blast injuries, wound trauma, structural collapse and mass casualty incidents in densely populated areas.
- **Rural and remote** areas may see fewer casualties overall, but longer evacuation times and limited stabilization capacity.
- **Deep remote and isolated areas** frequently rely on community members as the sole providers of initial care, with longer delays to advanced care.

Across all settings, civilians—including children, older adults and persons with disabilities—bear a growing share of the burden of injury and death (ICRC, 2016).

Health risks and injury patterns

The dominant health risks in conflict settings are traumatic injuries, particularly those associated with weapons and explosive devices. Uncontrolled bleeding is widely recognized as the leading preventable cause of death in conflict-related injury, making early haemorrhage control a central first aid priority (International Committee of the Red Cross, 2024).

Common injury patterns include:

- severe external bleeding
- penetrating injuries from gunshots or shrapnel
- blast-related polytrauma
- crush injuries from collapsed structures
- burns and inhalation injuries
- fractures and soft-tissue injuries
- minor injuries and illnesses sustained during displacement or evacuation.

Psychological distress is also present. Exposure to violence, loss and displacement contributes to acute stress reactions, grief and longer-term mental health challenges for both civilians and responders (World Health Organization, 2013).

Providing first aid in conflict-affected settings

Access to first aid resources

Access to first aid resources in conflict settings is highly unreliable and unstable. Some contexts may have access to trauma-focused equipment, such as tourniquets and haemostatic dressings, while lacking basic supplies like clean water, gloves or analgesia (pain relief).

Supply chains are frequently disrupted by insecurity, blockades or population displacement. Resources may be unevenly distributed due to security priorities or power dynamics, with civilians often receiving delayed or inadequate access compared to armed combatants. Community members often rely on pre-positioned kits, improvised materials or shared resources, particularly in remote or besieged areas.

In some conflict-affected settings, access to first aid and medical resources may be deliberately restricted or rationed based on perceived affiliation, identity or association with an opposing side. Civilians may be denied timely care because they are viewed as belonging to an “enemy” population, and individuals associated with opposition forces may face even greater barriers, including the intentional withholding of assistance by authorities or weapon bearers. Such practices are inconsistent with international humanitarian law and international human rights law, which require the wounded and sick to be cared for without adverse distinction. While the ICRC works actively to prevent and challenge these violations through dialogue, advocacy and presence, access to impartial care cannot always be secured in practice.

Human resources are equally constrained. Trained healthcare workers may flee conflict zones, leaving volunteers and community members to provide care under extreme pressure. National Society volunteers are often positioned in affected communities, sharing the same risks and losses as those they assist.

Access to advanced care

Access to advanced care in conflict settings is unpredictable and often delayed. Health facilities may be damaged, overwhelmed or deliberately targeted, despite international humanitarian law protections (ICRC, 2016).

Evacuation times vary widely:

- In some urban contexts, stabilization facilities may be nearby but unsafe to reach.
- In rural or remote areas, evacuation may take many hours or days.
- In isolated or besieged settings, evacuation may be impossible for extended periods.

These realities require first aid systems to prepare for prolonged care, including monitoring, prevention of deterioration and ethical decision-making when resources are limited. As a result, first aid education and planning in conflict settings must assume prolonged care as a baseline scenario rather than an exception.

Security and risk management

Security considerations fundamentally shape the delivery of first aid in conflict. Responders must continuously assess whether it is safe to approach, treat or evacuate a casualty. Time on scene is often deliberately minimized to reduce exposure to danger.

Local responders may demonstrate high risk tolerance, motivated by community ties and moral obligation. Over time, this can lead to the normalization of danger and cumulative psychological strain. International responders may operate under more restrictive security policies, which can limit the delivery of care. Effective systems acknowledge and manage this tension rather than ignore it.

Clinical priorities

Given injury patterns and evacuation delays, clinical priorities in conflict settings emphasize:

- rapid control of life-threatening bleeding, including use of pressure dressings, wound packing and tourniquets
- pelvic stabilization, often using improvised methods
- basic airway and breathing support consistent with trauma priorities
- prevention of hypothermia and shock.

Care is often delivered in harsh environments, requiring adaptability and sound clinical judgment rather than rigid adherence to protocols designed for stable settings.

First aid education in conflict-affected settings

Educational priorities

First aid education in conflict must prepare learners to make decisions under threat, not just to execute technical skills. Training should emphasize:

- dynamic risk assessment
- when to provide care and when to withdraw
- adaptation of techniques to security constraints (e.g. the misuse of tourniquets (International Committee of the Red Cross, 2024)

- ethical considerations, including impartiality and self-protection.

Improper or unsafe application of interventions, particularly tourniquets, has been documented in conflict settings and must be addressed through repeated, corrective practice (ICRC, 2018).

Training modalities

Experiential learning and simulation are particularly effective in this context. High-quality training can be delivered using low-cost materials if scenarios reflect real conditions. Key elements include:

- deliberate practice with feedback
- scenario-based training with increasing complexity
- structured debriefing to reinforce learning and address emotional impact.

Facilitators should consider participants' fatigue, stress and nutritional needs and adjust the training pace appropriately. In many contexts, training periods also serve as rare opportunities for rest and psychological recovery.

Learning materials and continuity

Access to digital learning is often limited by connectivity and security. Offline materials, printed handouts and portable reference tools remain essential. The ICRC and National Societies have developed multilingual, context-adapted materials to support continuous learning when formal training is disrupted.

Psychosocial and ethical considerations

First aid providers in conflict settings are frequently members of affected communities. They may experience cumulative exposure to death, injury and moral dilemmas, including situations where care cannot be provided safely or equitably.

Psychological first aid principles, such as ensuring safety, listening without pressure and linking to available support, are relevant not only for civilians but also for responders themselves (International Federation of Red Cross and Red Crescent Societies, 2015; International Federation of Red Cross and Red Crescent Societies, 2019). Peer support, informal debriefing and recognition of emotional burden are critical to sustaining responder capacity.

Ethical challenges are also inherent to conflict response. Decisions about prioritization, withdrawal, and self-protection must be acknowledged explicitly in training rather than left unspoken.

Coordination and humanitarian actors

National Societies typically operate in close coordination with the ICRC in conflict settings, benefiting from shared guidance, technical support and protection mandates. Other humanitarian actors, local authorities and community leaders also play critical roles.

Military medical services may be present, but coordination with civilian humanitarian actors requires careful navigation to preserve neutrality and trust.

Conclusion

First aid in conflict-affected settings is shaped by violence, uncertainty and moral complexity. The frequency of severe trauma, prolonged delays to advanced care and risks to responders demand a model of first aid that is adaptable, security-aware and ethically grounded.

Education and preparedness must reflect these realities, equipping responders with not only technical skills but also judgment, restraint and resilience. When appropriately supported, local responders and communities demonstrate remarkable capacity to save lives under extreme conditions.

For the Red Cross and Red Crescent Movement, strengthening first aid in conflict settings is inseparable from the broader humanitarian commitment to protect life, dignity and access to care.

Migration

Situational context

Migration is an increasingly defining feature of the modern world. Every year, millions of people leave their homes in search of safety, reuniting with family, livelihood or better opportunities. For many, this journey involves navigating dangerous routes, insecure living conditions and barriers to healthcare and basic services. These realities make access to first aid—and the ability to deliver or receive it—an essential humanitarian need.

Within the International Red Cross and Red Crescent Movement, first aid in migration contexts serves not only as an emergency response but also as a means to promote dignity, trust and inclusion. This approach aligns with the Migration Strategy for the International Red Cross and Red Crescent Movement, which positions migration as a long-term humanitarian priority and emphasizes dignity, access to services and community-based responses across all stages of the migration journey (IFRC, 2025).Whether at borders, in transit zones, detention centres or urban neighbourhoods, the capacity to deliver timely, culturally appropriate care saves lives and strengthens community togetherness.

Migrants include asylum seekers, refugees, people displaced by conflict or disasters, undocumented workers and individuals moving voluntarily for economic reasons. This diversity shapes the health challenges they face and the ways first aid must be adapted. Across the urban–remote continuum, first aid providers experience different logistical, cultural and ethical complexities, but the humanitarian principles of neutrality, impartiality and humanity remain constant (IFRC, 2025).

Understanding the migration context

While moving can create opportunity and safety, it also exposes people to injury, violence and environmental hazards. During transit, migrants may experience dehydration, hypothermia, malnutrition and exhaustion. At borders or in detention, they may face overcrowding and limited sanitation; in destination countries, they may endure unsafe working conditions and psychological stress linked to exclusion or uncertainty.

The relationship between migration and health is complicated (IFRC, 2025). Some migrants experience improved health through safety and access to care, while others suffer more due to exploitation, stigma or interrupted treatment. Structural barriers, such as legal status, poverty, language and discrimination often increase these risks (IFRC & Red Cross Red Crescent Global Migration Lab, 2021).

Urban settings

Urban areas attract large numbers of migrants seeking work or refuge, but may also reinforce inequality. Migrants often live in overcrowded housing or informal settlements, where fire, injury and communicable disease risks are high. For example, during the COVID-19 pandemic, many migrants in cities like Kuala Lumpur and Berlin were excluded from national vaccination and health information systems, leading to preventable illness (IFRC & Global Migration Lab, 2021).

People may technically have access to emergency care, but fear of detection or high costs may prevent them from using it. Language barriers and unfamiliar bureaucratic systems often discourage many from seeking help. For undocumented workers in construction or domestic labour, workplace injuries can go unreported or untreated due to fear of deportation (IFRC, 2017).

Urban first aid programmes must include advocacy and trust building, in addition to technical care, and offer safe, confidential spaces such as Humanitarian Service Points (HSPs) where migrants can receive assistance without discrimination.

Remote and transit settings

Along migration routes through deserts, mountains or seas, first aid can mean the difference between life and death. Remote settings are marked by limited infrastructure and supplies, and delayed access to advanced care. Migrants crossing the Sahara, the Mediterranean or the Darién Gap often face dehydration, exposure or trauma injuries without nearby health services.

In these areas, peer-to-peer first aid frequently becomes the only available response. National Societies operating along major migration corridors, such as the Nigerian Red Cross Society, Mauritanian Red Crescent and Mexican Red Cross, train community volunteers, including migrants themselves, to manage common conditions including heat exhaustion, wounds and dehydration. These initiatives demonstrate that empowering migrants as first aid providers enhances both survival and solidarity (IFRC, 2025).

Remote and mobile outreach teams must also plan for communication and referral chains when advanced care is hours or days away. The absence of ambulances or legal crossing permissions may require coordination with local authorities or humanitarian corridors to transport severely ill or injured individuals.

Access to first aid and advanced care

Migrants' access to first aid is often inconsistent and informal. In camps or settlements, there might not be enough trained responders, and supplies such as bandages, gloves and disinfectants may be limited. Migrant associations or informal networks often serve as the initial point of contact, sharing information by word of mouth about where to find assistance.

Access to advanced care, including hospitals and physicians, is even more challenging. Legal status, documentation and cost remain primary barriers. Asylum seekers awaiting status recognition may not be allowed access to public healthcare; undocumented migrants may avoid hospitals altogether for fear of detention or deportation (IFRC, 2016). Even when services are available, language and lack of digital access can make it hard to navigate complex health systems.

These barriers lead to delayed or missed treatment, turning minor injuries into chronic or life-threatening conditions. For example, in the German Red Cross study *Unseen?! Refugees with Disabilities in Germany*, 2023, many respondents reported deterioration of existing conditions because they could not access rehabilitation services (German Red Cross, 2023).

Addressing these gaps requires not only direct service delivery but trust-building and confidentiality guarantees so migrants know that seeking first aid will not expose them to risk.

Providing first aid in migration contexts

Key considerations

Providing first aid to migrants in vulnerable situations requires sensitivity to cultural, linguistic and legal realities. Providers must act impartially and maintain confidentiality, making sure there will be no legal consequences for the people to whom they provide care. Interpreters or cultural mediators are critical for communication, though family members should not be used to translate sensitive information.

First aid providers should also be aware of trauma exposure; many migrants have experienced violence, loss or perilous journeys. Psychological First Aid (PFA) techniques—active listening, empathy and reassurance—should be used with physical care.

Where trust is low, visibility and neutrality matter. Distinct Red Cross and Red Crescent emblems help migrants identify safe assistance points. Field teams must coordinate with protection and legal services when they suspect abuse or exploitation.

Common health and injury patterns

Migrants face injuries and illnesses linked to their environment and livelihoods:

- During transit – dehydration, hypothermia, heatstroke, exhaustion, cuts and grazes wounds, and fractures, sprains, and strains from walking long distances.
- At sea – hypothermia, saltwater sores, drowning risk and trauma from overcrowded vessels.
- In camps or shelters – respiratory infections, gastrointestinal illness, scabies and minor burns from unsafe cooking areas.
- At work – falls, crush injuries, chemical exposure and repetitive strain injuries.
- Psychological distress – anxiety, insomnia, post-traumatic symptoms or grief.

First aid programmes should therefore combine basic physical interventions with psychosocial care and referral pathways to specialized services when possible.

Urban versus remote care considerations

In urban areas, first aid provision focuses on outreach and inclusion. Mobile units or fixed HSPs in transport hubs and city outskirts provide immediate aid, distribute hygiene kits and connect migrants to clinics. Coordination with municipal authorities helps provide continued care while maintaining neutrality.

In remote areas, survival is the priority. Volunteers may operate with minimal supplies, improvising splints, pressure dressings and shelter. Communication equipment and referral partnerships are vital. When advanced care is delayed, monitoring, documentation and prevention of infection or dehydration become central responsibilities.

Both contexts highlight the need for context-specific training and adaptable equipment. Light, portable first aid kits and multilingual guidance cards enhance efficiency and accessibility.

First aid education for and with migrants

Training migrants as first aid providers

Empowering migrants through first aid education supports independence, safety and community resilience. Training should be accessible, relevant and trauma-informed. Courses must respect language diversity and literacy levels using visual materials, videos or demonstrations instead of text-heavy manuals.

For migrants on the move, training sessions should be short, flexible and location-responsive, delivered in transit centres or temporary shelters. Portable materials, such as laminated cards or mobile apps, allow learners to refresh their skills after relocation. In urban or stable contexts, multi-day courses can provide comprehensive instruction on both physical and psychological first aid.

Training should focus on practical scenarios that migrants are most likely to face: dehydration, burns, musculoskeletal injuries, fainting and stress reactions. Incorporating peer-to-peer learning reinforces trust and cultural relevance.

Training staff and volunteers supporting migrants

For Red Cross and Red Crescent staff and volunteers, cultural competence and trauma awareness are essential. Trainers should use participatory methods and facilitate discussion on ethical dilemmas, confidentiality and safe referral. Sessions must emphasize that first aid providers are humanitarian actors, not extensions of state authorities, to create a sense of safety and trust with migrants.

Interpreters and cultural mediators should be integrated into the planning and delivery process. Scenario-based exercises can model sensitive communication, helping participants avoid unintentional triggers. Continuous supervision, feedback and refresher training maintain quality and confidence (IFRC, 2017).

Psychological first aid and empowerment

Psychological First Aid should be a standard module in all migration-related programmes. It equips responders to manage distress compassionately and empowers migrants to support one another. Learning environments must be psychologically safe (avoiding role plays that replicate traumatic events) and should encourage reflection on hope, coping and community strengths.

Education modalities and accessibility

First aid education in migration contexts must reflect mobility and diversity. Effective modalities include:

- Modular learning: brief, stand-alone sessions adaptable to transit or camp settings.
- Visual instruction: diagrams, animations and video translation for multilingual audiences.
- Digital tools: where internet access is available, mobile platforms enable self-paced learning.
- Outdoor or small-group teaching: ensures inclusivity when indoor spaces are unavailable.
- Peer facilitation: migrants co-train peers, reinforcing ownership and sustainability.

Accessibility also means psychological comfort. Facilitators must acknowledge past trauma and provide breaks, safe spaces and supportive feedback. Building confidence is as critical as learning knowledge and skills; every participant should leave feeling capable of protecting themselves and others.

Legal, ethical and protection considerations

Migration raises unique ethical and legal concerns. Fear of authorities may cause migrants to hide injuries or illnesses. First aid providers must uphold confidentiality, neutrality and voluntary consent. Personal data should be collected only when necessary and stored securely.

Providers should also be able to identify and report protection risks, such as trafficking or gender-based violence, through established humanitarian channels. Training should clarify how to balance immediate life-saving duties with longer-term protection obligations.

Red Cross and Red Crescent visibility—through recognizable emblems, signage and consistent messaging—helps reassure migrants that assistance is humanitarian and independent. Partnerships with local NGOs, legal aid groups and community leaders strengthen referral systems and trust.

Conclusion

Migration is not a single journey but a continuum of experiences that shape health, vulnerability and resilience. Across this continuum, whether at a remote border post or within an urban neighbourhood, first aid remains a vital humanitarian act that restores dignity and saves lives.

Delivering and teaching first aid in migration contexts requires contextual understanding, cultural sensitivity, and partnership with migrants themselves. By integrating first aid education into humanitarian service delivery, the Red Cross and Red Crescent Movement empowers migrants as active agents of care rather than passive recipients.

In both urban and remote settings, inclusive and accessible first aid bridges protection, health and hope. It ensures that no one, regardless of origin or status, is left behind..

Epidemic and health crises

Situational context

Epidemics and pandemics are some of the most complex contexts for providing and teaching first aid. They overwhelm health systems, place stress on communities and cause fear—yet injuries, cardiac arrests and medical emergencies continue. Even when there are infection risks, first aid must continue. Protecting both the responder and the person receiving care becomes central to the humanitarian principle of "do no harm".

Outbreaks such as Ebola in West Africa (2014–2016), COVID-19 (2020–2023) and regional epidemics of cholera, measles and influenza have shown that when communities are trained and prepared to act safely, they can save lives and build trust in public health systems (Honein et al., 2020). First aid in epidemic settings requires not only technical skills but also risk awareness, infection prevention and psychosocial resilience.

Protecting the first aider, the person receiving aid and bystanders remains at the heart of first aid efforts. Continuing first aid training and services during health crises is also a strategic priority: it strengthens community resilience and trust in healthcare providers.

The International Federation of Red Cross (IFRC) and the World Health Organization (WHO) emphasize that first aid services and education must continue, even under movement restrictions, using safe practices, protective equipment and creative delivery methods. These actions support community resilience, save lives and help counter fear and misinformation.

In epidemic and pandemic contexts, first aid education guidelines and good practice emphasize that first aid providers must always begin by assessing scene safety and the risks to both themselves and the injured or ill person. Providers should use appropriate medical-grade personal protective equipment (PPE), such as masks, gloves, eye protection and gowns, selected according to the suspected mode of disease transmission. Hand hygiene is essential and should be performed before and after every interaction, even when gloves are worn. When respiratory transmission is suspected, guidelines recommend performing compression-only cardiopulmonary resuscitation (CPR) and applying an automated external defibrillator (AEDs) as soon as possible, with the person's mouth and nose loosely covered using a surgical mask, cloth or face covering to reduce the spread of respiratory droplets. Across all first aid situations—including bleeding, burns and wounds—good practice encourages supporting and promoting self-management whenever possible, thereby reducing close contact while still providing effective care.

Understanding epidemic and health crisis contexts

Scope and characteristics

According to the WHO (2025), an outbreak occurs when disease cases suddenly increase in a specific area. An epidemic occurs when the number of cases is higher than expected across a region or country. A pandemic involves the disease spreading globally and continuing to spread in communities. Regardless of the size of the outbreak, these events disrupt normal healthcare and increase risks for responders.

The One Health framework links human, animal and environmental health, reminding us that pandemics are often cross-sectoral—coming from diseases that spread from animals and environmental disruption. First aid systems must therefore follow national public health and emergency frameworks on aspects such as disease monitoring, hygiene and vaccination guidance.

These definitions, established by the WHO, should be interpreted according to the national context and frameworks for preparedness and response to health emergencies.

Urban contexts

In cities, diseases spread faster because of large populations and crowded spaces. Shared housing, public transportation and busy workplaces make it easier for germs to spread, and false information can move quickly online. During COVID-19, cities like Milan, New York and São Paulo saw more people having cardiac arrests at home or in public, forcing bystanders to balance helping with the risk of infection (Ferrari et al., 2022).

Urban first aid providers often have access to hospitals and advanced care, but these systems can become overloaded during a major outbreak. Hospitals might run out of space, and providers may need to improvise, sort patients by urgency (triage) and sometimes care for people longer in homes or community shelters. The emotional toll—fear of infection, loneliness and stigma—can also make people less willing to help.

To prepare for outbreaks, cities should build strong infection-control systems, like handwashing stations, good ventilation and proper waste management. They should also train first aiders, volunteers and bystanders to safely use personal protective equipment (PPE).

Remote contexts

In remote and rural settings, outbreaks present different challenges, including delayed access to medical care, limited diagnostic tools and minimal protective supplies. During the Ebola crisis, rural first aid providers in Sierra Leone and Guinea often improvised isolation and hygiene measures using local materials while waiting for medical teams to arrive. Similarly, remote communities during COVID-19 relied on community health volunteers trained in basic infection prevention, triage and transport coordination.

Living in isolated areas may limit infection spread initially, but it also makes it harder to get supplies such as PPE and disinfectants. Limited internet connectivity complicates training continuity as well. Remote first aid providers must therefore have simple, context-appropriate infection-control tools, such as handwashing with locally produced soap, physical distancing and outdoor training environments.

Assessing risk and preparedness

Preparedness in a health crisis requires determining the type of risk to all involved. The table below summarizes three transmission risk levels, with examples, protective priorities and implications for first aid education.

Transmission risk	Examples	Protective priorities	First aid education implications
High (respiratory)	COVID-19, influenza, tuberculosis	Masks, eye protection, ventilation, distancing	Train on donning/doffing PPE, compression-only CPR
Moderate (contact or droplet)	Cholera, Ebola, meningitis	Gloves, gowns, hand hygiene, disinfection	Safe waste disposal, pair-checking during PPE removal
Low (vector-borne)	Malaria, dengue	Environmental control, repellents	Incorporate One Health awareness

Risk assessment should be continuous. Where infection rates are high, first aid providers may need to modify standard procedures, striking a balance between life-saving action and self-protection. The guiding principle remains: intervene safely, not recklessly (Donovan et al., 2024).

Typically, national and international health agencies will provide guidance for people facing an endemic health crisis.

First aid during health crises

Protection and assessment

First aiders must always begin with scene safety and risk assessment. Observation from a distance can help determine consciousness and breathing before contact. When possible, the person should be encouraged to perform self-care actions, such as applying pressure to a wound or using an inhaler, while guidance is given verbally.

Essential precautions include:

- Using medical-grade personal protective equipment (PPE, such as mask, gloves, eye protection, gown) suited to the mode of transmission (Lindberg et al., 2020).
- Performing hand hygiene before and after every interaction, even when gloves are worn.
- Maintaining physical distance and ensuring adequate ventilation (Ferrari et al., 2022).
- Proper donning and doffing of PPE—ideally monitored by a second trained responder—to reduce contamination risk.

In resource-limited settings, responders can use local alternatives (e.g. washable cloth masks, improvised eye shields) but must still follow safe hygiene practices.

Core first aid adaptations

- Cardiopulmonary Resuscitation (CPR): When respiratory transmission is suspected, perform compression-only CPR and apply an automated external defibrillator (AED) as soon as possible. Provide ventilations only when full PPE is available, and cover the person's mouth and nose with a light cloth or mask to reduce droplets.
- Bleeding and wounds: Use gloves, control bleeding with pressure and encourage self-application if possible. Dispose of dressings safely.
- Burns and eye injuries: Flush with clean water or saline; avoid direct contact.
- Fainting or collapse: Position the person safely without close face-to-face contact; monitor breathing visually.

If advanced care is delayed, first aid providers should maintain isolation and monitor the person's condition while preventing exposure to others.

Coordination and communication

Working together with public health authorities and humanitarian agencies keeps first aid protocols and infection-control measures consistent. Local coordination may include referral to isolation facilities, communication through radio or mobile networks, and documentation for contact tracing. Honest communication builds community trust and reduces panic.

First aid education considerations in epidemic contexts

Adapting education safely

During epidemics, continuing first aid education helps communities stay prepared and resilient. Training should follow national health directives and include infection-prevention measures such as small class sizes, distancing, mask use and ventilation. When physical gatherings are unsafe, distance or blended learning ensures access to essential knowledge (Ferrari et al., 2022).

Practical courses should emphasize:

- donning, doffing, and disposing of PPE under supervision
- disinfection of surfaces and training equipment (Sopwith et al., 2002)
- individual rather than shared use of mannequins, bandages and materials
- scenario-based learning that integrates infection-control decision-making.

Hybrid models that combined self-paced e-learning with short, well-ventilated in-person sessions proved successful during COVID-19 across National Societies.

Supporting learners and trainers

Health crises generate anxiety and fatigue. Programmes should include psychosocial support and regular breaks for both learners and facilitators. Clear pre-course communication about protective rules, symptoms and exclusion criteria builds confidence. Participants with symptoms or recent exposure should be temporarily excluded and provided remote learning alternatives.

Visible information at entry points (posters, QR-codes, symptom lists) reinforces vigilance. Learners benefit from being treated as partners in safety, actively engaged in risk reduction and mutual protection.

Hygiene and facility management

Learning spaces should ensure handwashing facilities or alcohol-based solutions (60–80% concentration) and good ventilation. Cleaning logs should document disinfection before and after sessions. Equipment and manuals should be assigned individually, or digital copies provided on tablets to avoid sharing (Honein et al., 2020).

Where resources are scarce, education can take place outdoors or under open shelters to maximize airflow while maintaining cultural sensitivity and inclusion.

Psychosocial, ethical and cultural dimensions

Health crises increase fear, stigma and ethical dilemmas. First aid providers may hesitate to help for fear of infection or discrimination. Psychological First Aid principles—Look, Listen, Link—provide a compassionate framework for addressing distress while maintaining boundaries (World Health Organization & War Trauma Foundation and World Vision International, 2011).

Providers should be taught to manage fear and fatigue, use grounding techniques and access peer support. In many cultures, collective or spiritual coping strategies (communal prayer, storytelling or rituals) strengthen resilience and reduce stigma.

Ethically, balancing duty of care with personal safety is central. Programmes should include guided discussions on when to act, how to use PPE responsibly and how to decline unsafe requests without guilt. Emphasis should be placed on honest communication, empathy and respect for local customs to build trust between providers and communities.

Conclusion

Epidemic and pandemic contexts demand adaptive, compassionate and safety-focused first aid systems. Protecting both providers and recipients is essential not only for infection control but for maintaining community trust and continuity of care.

Whether in a densely populated city or a remote rural settlement, first aid providers are a crucial link in public-health resilience. By integrating infection-prevention practices, context-appropriate education and psychosocial care, National Societies can ensure that help continues safely even in the event of an outbreak.

Ultimately, epidemic preparedness in first aid is more than a technical measure; it is a reaffirmation of humanitarian solidarity: that no one, regardless of circumstance, should face an emergency alone.

FIRST AID EDUCATION

Central to the resilience of individuals and communities is the ability to respond effectively in a crisis. The Movement views first aid as one of the greatest humanitarian acts and first aid education as an integral part of building resilience. A 2025 Cochrane systematic review showed that we can be moderately confident that first aid training of lay people (those with no formal healthcare training) can increase their knowledge, skills and belief in their own capacity to act in an emergency (Kendall et al., 2025). As the largest provider of first aid education in the world, the Movement must advocate for and provide high-quality, accessible education so everyone can give help safely and effectively in a first aid emergency. Here, we provide the essentials to aid programme designers in doing this. The Education chapter includes a selection of contexts for first aid education and an overview of modalities to implement high-quality first aid education. Uniform tools to measure the quality of education interventions and their impact in terms of behaviour change remain as gaps in practice and research (Kendall et al., 2025).

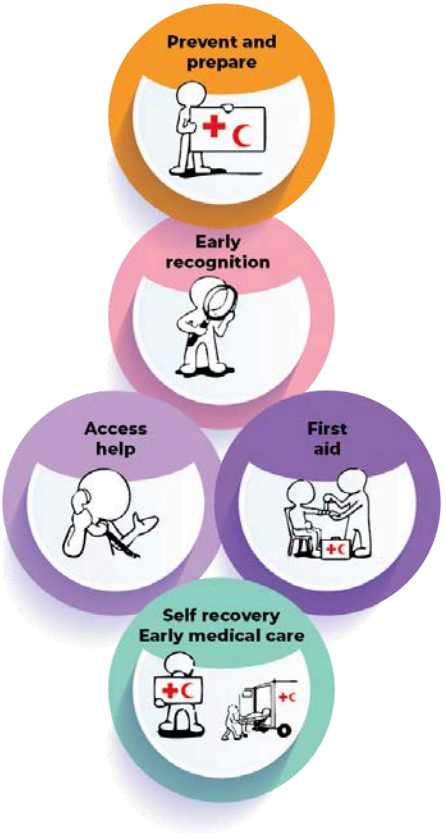
Chain of survival behaviours

The chain of survival behaviours (CoSB) defines the broad domains of first aid education. Considering each first aid topic alongside the CoSB domains provides the scope in which to emphasize and develop helping behaviours throughout the lifecycle of first aid education. For example, some topics, such as stroke, usually focus on recognition, while others, such as bleeding, usually emphasize first aid skills.

The CoSB also provides a structure for communicating educational messages. For example, we can use media to prepare people for heat emergencies, inform them of early response or help them recover from a heat emergency. We can use visual aids to help people recognize different conditions, as well as scenarios and role-play to practise first aid. We can use technology to alert people to imminent danger or to help them access support.

The five domains of the CoSB

Visualized as a chain, each domain recognizes a unique yet connected set of knowledge, skills and attitudes that help an individual or organization limit suffering and promote healing.



1. The first domain emphasizes the role of prevention and preparedness in reducing the impact of emergencies by having people prepared to respond quickly and with the necessary resources (human and tools). The act of preparing also raises awareness of hazards and reduces risky behaviours.
2. The second domain emphasizes early recognition of environmental dangers and assessing the ill or injured to make care decisions.
3. The third and fourth domains of response have two actions that can occur at the same time if needed: providing first aid and accessing help, if appropriate, depending on the severity, number of first aid providers and resources.
4. Last in the sequence is the domain of recovery, which can occur with or without medical care. Notably, the recovery process should include care and support for the responder.
5. A holistic first aid education programme must help the learner move through each domain to have the best outcome in an actual emergency. The approach taken to help learners through each domain may be unique and learned separately or as part of an integrated programme. Developers need to help learners consider how their knowledge and skill acquisition can help support their behaviour change for each part of the chain. Assessment of first aid curricula should ensure that each domain is accounted for in the overall educational experience of learning first aid.

Implementation of first aid education

National Societies and teams responsible for delivering first aid education should consider how their programmes can support broader organizational goals.

At the most basic (elemental) level, first aid education covers physiological, psychological and social content that promotes the health and resilience of individuals, communities and populations. These topics, detailed in the Clinical chapters of the Guidelines, can be grouped into courses.

When designing campaigns to implement these courses, it is important to consider the needs of the target learners, available resources (such as time and budget) and desired outcomes. Courses may stand alone or be part of larger public campaigns aimed at changing behaviours on a broader, population level in response to identified issues or opportunities.

At the corporate level, each National Society is responsible for overseeing the implementation and evaluation of these programmes. This includes aligning them with the Fundamental Principles, using evidence-based practices and ensuring high-quality instruction.

Principles of first aid education

Principles of first aid education exist to support designers in developing first-aid programmes that match the needs of their learners.

These principles should be applied to any first aid education intervention:

- Link to learners: Consider all aspects of the learner group (age, gender, responsibilities, needs, etc). Adapt your approach so it is relevant and based on contexts they recognize.
- Provide variety: Use a variety of activities to engage the learner, develop their skills and construct their knowledge.
- Keep it simple: Restrict content to what is necessary and keep learning messages simple: avoid overloading learners with content, topics or techniques that they are unlikely to come across or would not be able to use.
- Encourage discovery: Allow time for learners to explore and reflect on what they have learned to develop their attitude and confidence to help.
- Be clear: Use language that the learners understand and that builds confidence. Avoid scientific language or overly complex theories.
- Be outcome-driven: Identify learner outcomes (such as knowledge and confidence) and measure how these change between the start and end of your education intervention.

Approaches to building first aid education

Understanding emergency response behaviour

Teaching first aid requires a well-structured approach, tailored to different individuals and groups. Below are three theories that can help guide this process. People's responses to emergencies can vary based on their demographics, culture, past experiences and other factors, such as media exposure. First aid education needs to consider these aspects to promote both short-term and long-term behaviour changes.

Integrative Model of Behaviour Prediction

The Integrative Model of Behaviour Prediction, developed by Fishbein and Yzer in 2003, combines the Theory of Reasoned Action and the Theory of Planned Behaviour. This model emphasizes that attitude, subjective norms and perceived control influence behaviour. For first aid education to be effective, it is crucial to understand learners' motivations. By focusing on why learners want to help and showing them the impact they can make, we can boost their confidence and increase their likelihood of assisting in emergencies.

Transtheoretical Model

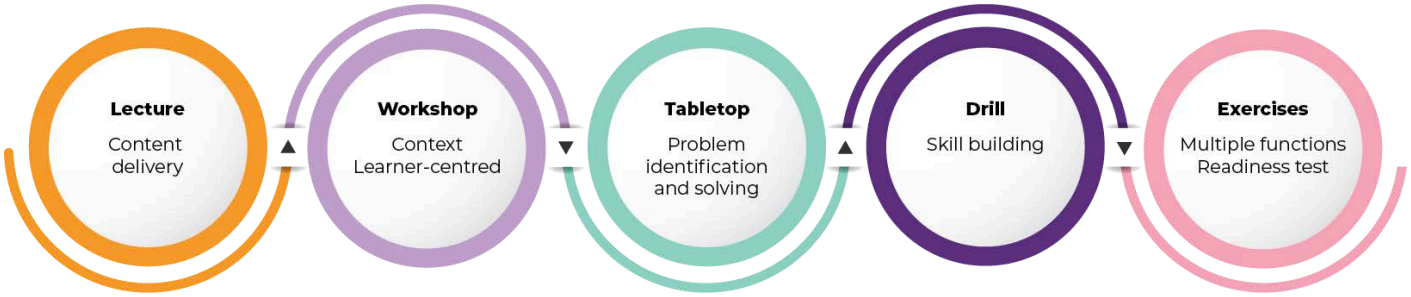
The Transtheoretical Model, proposed by Prochaska and DiClemente in 1983, breaks down behaviour change into stages: from not being aware of a behaviour to knowing about it, planning to adopt it, implementing it and maintaining it. This model may help organize a first-aid education element, course or campaign into stages to support behaviour change. For first aid education, this means identifying where learners are in this process and designing targeted approaches. For instance, raising awareness about evolving climate-related hazards is different from updating workplace first aid courses with the latest medical practices.

Experiential Learning Theory

Kolb's Experiential Learning Theory from 1984 suggests that people learn best through experience and reflection. In first aid training, this means creating scenarios that allow learners to practise and reflect on their actions when practising scenarios at the elemental and course levels. This hands-on approach helps them test and refine their responses in a safe environment, enhancing their readiness for real emergencies.

Continuum of educational activities

A continuum of group activities offers a structured approach to training exercises, making them highly applicable to first aid education strategies. By progressing through discussion-based exercises (e.g. seminars, workshops, tabletop scenarios) and operations-based exercises (e.g. drills, functional and full-scale exercises), organizations can scaffold first aid training from basic knowledge acquisition to complex, real-world application. This allows National Red Cross Red Crescent Societies and branches to work beyond individual training and look at readiness levels of families, communities, businesses and populations to manage health and safety risks.



For first aid education, this continuum enables educators to introduce foundational concepts, such as CoSB, in traditional courses, but also through seminars and tabletop exercises, allowing learners to explore prevention, recognition and response concepts in a low-pressure environment and relevant contexts before practising hands-on skills in drills and scenarios that simulate emergencies.

Integrating this framework with first aid campaigns and corporate-level work helps ensure learners achieve competence across all CoSB domains by matching exercise complexity and modality to learning objectives. For instance, early exercises can focus on knowledge retention and recognition (CoSB domains 1 and 2). More advanced, scenario-based drills allow learners to practise providing aid and accessing help (CoSB domains 3 and 4). Post-event debriefs can facilitate reflection on recovery and responder well-being (CoSB domain 5). This methodology supports continuous evaluation and improvement, making first aid education responsive to learner needs and better aligned with the behavioural outcomes essential for community resilience.

Motivation to learn first aid

Key action

Consider the individual's and/or population's specific motivation to learn and use this to inform the educational approach, resources and content included in first aid education.

Introduction

People have different motivations to learn first aid, the strongest being a requirement to attend a course (e.g. for work or school). Other motivations include, for example, if learners have a friend or family member at risk of illness or injury, if they live far away from healthcare services, or if there is limited access to EMS. When learners are motivated, they are more engaged and invested. This enhances their retention and application of skills. Personal relevance, practical applications and positive learning environments can increase motivation. Ultimately, motivations must outweigh barriers to attending.

Guidelines

- First aid programme designers should advocate for first aid education and recertification as a requirement for specific groups, such as schoolchildren, new drivers and employees, to organizations and legislatures.**
- First aid education should be made accessible (available, affordable and focused) to those who care for at-risk family members, vulnerable populations and those in remote locations.**
- Self-directed learning completed in a familiar context (e.g. at home) may improve individuals' motivation to achieve the learning outcomes successfully.*

Good practice points

- Use community communications, contexts and networks to increase motivation for learning.

Chain of survival behaviours

Motivation is incorporated throughout the CoSB. Different motivations exist for attending training (prevention and preparedness).

Education considerations

Learner considerations

- By aligning first aid training with the specific motivations to attend, programme designers can create more efficient and effective campaigns.
- Understanding the motivations and needs of the audience will then support first aid education strategies used within programmes.
- A positive attitude towards first aid is helpful as it can lead to an increased willingness to engage in first aid training and application in emergencies. Promoting the relevance and

importance of first aid across various age groups and educational backgrounds could further enhance these positive attitudes.

Facilitation tips

- Encourage learners to share their first aid experiences, as this will help to understand their motivation for attending and resolve any concerns they have about providing care in an emergency.

Scientific foundation

Workplace and educational requirements

- Job and role-specific necessity: Cariou and Pelaccia (2017) and Platz et al. (2000) found that legal or regulatory mandates, such as workplace requirements, significantly influence individuals' decisions to seek out first aid education, often more so than personal reasons, like having an at-risk family member. Weaker evidence was found regarding the duty to care in sports, awareness of opportunities (Fortington et al., 2019); recertifying after certification had expired, and “to be prepared/ just in case” (Bouland et al., 2017).
- Educational and training settings: The importance of training in schools is highlighted by Supraja et al. (2021) who found that teachers who learned of their ignorance of dental trauma were motivated to learn more. Similarly, Jaskiewicz and Timler (2023) found that raising awareness of training opportunities and the need for training increased people's motivation to attend future courses.

Family and personal circumstances

- Parental and caregiver responsibility: Many studies suggest that personal experiences, particularly related to caring for children or elderly family members, are significant motivators for learning first aid. Huang et al. (2016) identified the characteristics of Chinese students who were willing to learn CPR. They considered the development of the local emergency system to be excellent, cardiovascular diseases were present within their family, and they had previously heard about CPR. Kliegel et al. (2000) noted that individuals with cardiovascular at-risk family members who had taken a one-day CPR class were more likely to motivate their family members to attend at a higher rate than a control group.

Cost and accessibility

- Affordability and accessibility: Fortington et al. (2017) and Pearn et al. (1980) also highlighted that reducing the cost of first aid training would likely increase participation rates, especially among at-risk populations.
- Self-led and home-based learning: Studies by Greenberg et al. (2012) and Kliegel et al. (2000) revealed that individuals with an at-risk family member or those who have been advised by a doctor to learn CPR often preferred self-led learning or home-based courses, as these formats are more flexible and convenient. This suggests that alternative learning methods, such as online or at-home training, could increase engagement, especially among individuals who find traditional course formats challenging.
- At-risk populations: Huang et al. (2016) found that having an at-risk family member can positively influence one's motivation to learn first aid. However, this motivation is not as

strong as other factors, such as legal requirements or workplace mandates. This suggests that while personal circumstances play a role, structured, compulsory training may be a more powerful motivator for many individuals.

First aid education for children

Key action

Encourage children to develop essential first aid knowledge and skills and foster a lifelong learning mindset.

Introduction

First aid education involves teaching children the knowledge and skills necessary to respond to emergencies. This topic explores how to effectively develop first aid abilities in children of various ages, focusing on methods to help them retain these skills and attitudes across different settings and contexts.

Guidelines

- Contextual relevance: First aid programmes should be designed based on the educational pathway outlined by the Centre for Evidence-Based Practice (CEBaP), ensuring that the content is appropriate for children's intellectual, social and behavioural development.**
- Engagement through active learning: Combining hands-on training with secondary methods (e.g. educational songs) can enhance children's ability to retain knowledge and increase their confidence in using these skills during emergencies.**
- Schoolteacher training: Training teachers to deliver first aid education is often more effective, time- and cost-efficient, and contextually relevant than relying on external medical facilitators.**

Good practice points

- Create a positive learning environment: Create a space where learning is recognized and rewarded, and where children are comfortable asking questions and participating.
- Use relevant scenarios: Design learning experiences around real-life situations that encourage children to draw on their own life experiences. This helps them understand the importance and practical application of first aid.
- Repetition: Repeated exposure to first aid concepts and skills helps children reinforce and retain their knowledge. While the ideal frequency of repetition is not definitively established, periodic refreshers are beneficial.
- Age-appropriate learning:
    - In settings where access to medical care is complex, it may be more appropriate to teach children how to seek medical help at age 9 or 10. This knowledge should be revisited until they are 18 years old.
    - Teach children the importance of handwashing before and after administering first aid, especially in environments where infectious diseases are prevalent. This practice should also be revisited throughout childhood and adolescence.

- Teach younger children how to assess emergency scenes and call for help through activities appropriate for their age. This helps children understand their role in emergencies and the importance of scene management.

Education considerations

Context considerations

- Always ensure that first aid programmes for children align with your organization's child protection policies, as well as those of any partner organizations (e.g. schools).
- Choose the timing of first aid programmes carefully (e.g. avoid school exam periods).

Facilitation tips

- Keep messages simple: Ensure that first aid messages are short, clear and focused on practical outcomes. Use rhymes or songs to help retain information or desired behaviours.
- Appropriate language: Tailor language to the age and experience of the children. Avoid medical terms and use words that are easy for children to understand.
- Start with what they know: Begin by asking children what they already know about the body and why first aid is important. This allows you to build on their existing knowledge.
- Acknowledge experiences: Facilitate discussions where children can share their experiences with emergencies or illnesses. This helps to create a supportive learning environment, particularly for children who may have experienced trauma (e.g. loss of a family member or a serious accident). Make connections between first aid and everyday life so that children can see the usefulness of first aid in their daily lives.
- Recognize progress: Praise children's progress and highlight their efforts and achievements.
- Peer learning: Support the development of first aid clubs or groups where children and young people can teach and learn from each other. Peer influence, especially from older children, can significantly enhance learning.
- Family engagement: Encourage children to share their first aid knowledge with their families, fostering a wider community understanding of first aid.
- Integrate first aid into other subjects: Enhance children's interest in first aid by integrating it into various subjects, such as biology or physical education classes.
- Simulation-based learning: Encourage teachers to incorporate first aid learning through simulations, where children practise real-world scenarios in a safe and controlled environment.

Facilitation tools

- Scenario-based learning: Create engaging, age-appropriate scenarios that allow children to apply their life experiences. Some examples include:
  - role-playing with scripted scenarios
  - simulating various injuries or medical conditions
  - encouraging children to develop their own emergency scenarios
  - practising first aid in less conventional environments (e.g. in a vehicle or outdoors) rather than just in a classroom setting. Always ensure that these activities follow the latest child protection policies.

- Interactive learning: Use games, quizzes, videos and online apps to make learning fun and interactive.
- Teacher support: Share short webinars or instructional videos with useful tips and guidance to help teachers who may lack confidence in delivering first aid education.
- Blended learning: Use a variety of learning approaches, such as flipped learning or blended learning, which combine online content with in-person instruction. These methods can yield results similar to those of traditional classroom-based teaching.

Scientific foundation

The educational pathway developed by CEBaP focuses on first aid education for children, incorporating insights from systematic reviews (2015, 2019) and emphasizing the impact on knowledge, skills and attitudes across different age groups, especially in low and middle-income countries. The pathway uses an "encourage, know, repeat" framework, where the "encourage" and "repeat" stages are designed for facilitators and the "know" stage is for learners. This pathway, plus findings from additional sources, are summarized here:

1. Basic first aid skills: Evidence suggests children as young as six can learn basic first aid. Teaching strategies, such as problem-solving and cooperative learning, can enhance outcomes, although the evidence is of low certainty. Contextual adaptations should be considered in all cases. For example, in contexts where access to medical care is more complex (such as low-resource settings), teaching this topic might be best delayed until children are 9 or 10 years old. In contexts where disease prevalence is higher, an important focus of first aid education should be handwashing (De Buck et al., 2015; Suwanpairoj et al., 2020).
2. Skill development timeline: Children should learn basic first aid for burns, bleeding and skin wounds by the ages of 7–8, with more advanced topics such as CPR introduced by the ages of 11–14 (De Buck et al., 2015; Dumcke et al., 2021).
3. Learning CPR in school: Many authors recommend CPR training in schools (Bohn et al., 2012; Böttiger, 2015; Böttiger et al., 2016; Ellis et al., 2020; Kehlert et al., 2024; Lanzas et al., 2022; Lukas et al., 2016; Pivač et al., 2021; Reveruzzi et al., 2016; Semeraro et al., 2021, 2023), indicating that early and compulsory CPR education can lead to lasting behavioural changes and improved outcomes in cardiac arrest situations. In the *Kids Save Lives* study, Lukas et al. (2016) concluded that repeated annual CPR training for at least three years can result in long-lasting learning. Furthermore, Kehlert et al. (2024) highlighted that trained schoolteachers can effectively teach CPR without medical staff, and Lanzas et al. (2022) found that teacher-led training is equally effective and more cost-efficient than training conducted by health professionals.
4. Learning approaches: Suwanpairoj et al. (2020) showed that simulation-based training improves students' confidence and skills in basic life support (BLS). Cons-Ferreiro et al. (2023) studied the “flipped classroom” approach and found no significant differences between flipped learning and conventional methods in teaching BLS, indicating both are effective. Semeraro et al. (2024) developed a blended learning programme that integrates lectures, hands-on training and virtual reality, improving students' readiness to respond in emergencies. Jaskiewicz & Timler (2023) noted a preference among Polish youth for hybrid training methods that incorporate online resources alongside traditional

instruction. Eley et al. (2019) advocated for web-based games like *Body Busters* to improve knowledge among junior students (ages 7–11), suggesting that further levels could enhance learning for older students. Allan et al. (2023) found that peer- and self-directed training methods are as effective as instructor-led approaches, emphasizing the need for practical training opportunities.

5. Mental health first aid: Studies by Rossetto et al. (2020) and Yousefian and Mohamadirizi (2023) highlighted the effectiveness of mental health first aid training in improving self-efficacy and literacy among adolescents. Research by Martínez-Isasi et al. (2022) suggests that culturally and linguistically diverse (CALD) youth benefit from tailored mental health first aid training, which enhances their skills and increases their intention to seek help.

Online and blended learning

Key actions

- Use online and blended learning to develop first aid competencies for both adults and children to improve flexibility and effectiveness in first aid education.

Introduction

Online learning refers to self-directed or facilitator-led interactive tools that learners access through digital devices. Blended learning combines online self-study with supervised and coordinated, facilitator-led sessions. Both approaches offer flexibility and accessibility for diverse audiences.

In recent years, digital content for online first aid training has experienced significant growth. It is essential to be vigilant about the reliability of this content.

The benefits include:

- Flexibility: Learners can access materials and complete coursework at their own pace and convenience.
- Cost-effective: Reduces the need for travel and physical resources, lowering overall training costs.
- Interactive learning: Combines online modules with hands-on practice for a comprehensive learning experience.
- Accessibility: Provides access to expert instruction and resources regardless of geographic location.
- Consistency: The use of video provides consistent modelling to support consistent delivery.
- Engagement: Multimedia and interactive elements help to maintain learner interest and improve retention.

Guidelines

- Online learning can be an effective method for teaching first aid knowledge, particularly for topics like heart attack, asthma treatment, burns treatment and defibrillator use.**
- Online learning can be a cost-effective method for public information campaigns.*
- Consider using a blended learning approach for cardiopulmonary resuscitation (CPR) and Basic Life Support (BLS) training, as it can be effective for knowledge transfer and increasing confidence.*
- Blended learning approaches can offer additional benefits such as flexibility and reduced training costs.*

Good practice points

- Ensure that proper safeguarding measures are in place, especially for children.
- Combine self-directed learning with facilitated sessions that focus on practical skills.

- Check the material sourced from the internet to ensure its reliability.
- Encourage peer interactions to influence learners' attitudes and confidence.
- Promote repetition and practice outside official learning time.
- Use interactive videos that incorporate exercises, quizzes or games to reinforce learning and encourage engagement.
- Include links to additional resources, such as websites or reference materials, to encourage learners to further explore their knowledge.

Chain of survival behaviours

There is evidence that online learning can increase knowledge. Combining online learning with face-to-face sessions can be an effective way to develop practical skills. Both knowledge and practical skills are critical for building confidence and a willingness to act. Therefore, programme developers can use blended and online learning to support learners across all five domains of the CoSB: prevent and prepare, early recognition, accessing help, first aid and self-recovery.

Education considerations

Context considerations

A variety of adult and child learner audiences may use online learning. Learners' cultural and socio-economic backgrounds may influence their confidence and ability to complete online learning. Online learning can be highly effective but relies heavily on technology. Consider the learners' context, including their access to technology, internet connectivity and technical literacy.

Consider taking the following actions to best support the learning experience:

- Provide offline access options and printable resources.
- Consider data privacy and security, especially for minors.
- Offer technical support and encourage peer support networks to enhance engagement.

Learner considerations

Online learning can have social benefits if learners can interact and collaborate; however, learners' age, as well as cultural and socio.economic backgrounds, may influence their confidence and ability to use online apps or tools. Confirm how familiar and comfortable your learners are with online learning.

Facilitation tips

- Use online learning to complement face-to-face facilitation, improving learners' knowledge and skills. Note that while there is evidence that online learning can improve learners' knowledge, there is not enough evidence to suggest it can be used as a standalone tool for developing skills.
- Encourage learners to revisit the online content for reference and retention. This may help them to retain knowledge for longer periods of time.
- Implement adequate safeguarding measures, especially for more vulnerable learners.
- Explore different delivery methods, including mobile apps, using games (gamification) and multimedia (e.g. 3D videos, augmented or virtual reality).

Scientific foundation

Recent research has extensively examined the efficacy of technology-enhanced learning methods in first aid education. This review synthesizes key findings to inform the guidelines for first aid instruction.

Online learning

Bylow et al. (2019, 2020) advocated for web-based education formats that integrate various learning activities to improve BLS outcomes. While Reder et al. (2006) found independent computer learning to be effective for acquiring CPR knowledge, they noted challenges in teaching physical skills through this medium. Yeung et al. (2017) demonstrated that interactive games like "Lifesaver" were most effective when combined with face-to-face facilitation.

Doucet et al. (2018) found no significant difference in knowledge or skills between app-based learning and facilitator-led courses, though the latter excelled in specific tasks. Mancini et al. (2009) demonstrated that online learning is non-inferior to facilitator-led courses, despite self-directed learners scoring lower on practical skills. Brannon et al. (2009) observed that pre-class videos improved CPR skill performance among parents when viewed before hands-on training.

Blended learning approaches

A systematic review by Abuejheisheh et al. (2023) revealed that blended learning significantly enhances knowledge and skills retention in BLS compared to traditional methods, while reducing costs. Elgohary et al. (2022) corroborated these findings, indicating that blended learning is as effective as traditional methods for participant satisfaction and skill development. Oliver et al. (2020) found that blended learning improves learners' willingness and confidence more than facilitator-led sessions alone. Ko et al. (2024) reported that increased practice opportunities during in-person sessions contribute to better CPR compression speed performance.

A randomized controlled trial on first aid blended learning in adult lay people in Rwanda showed a significant improvement in knowledge, skills, self-efficacy and willingness to help, compared to no training, and showed that outcomes were non-inferior to facilitator-led training (Kendall et al. 2026).

Innovative approaches

Semeraro et al. (2024) reported high engagement levels with virtual reality, particularly among younger students. Cons-Ferriero et al. (2023) found flipped classroom approaches as effective as traditional methods for teaching CPR to primary students. Kim and Cho (2023) demonstrated that medi-VR simulation resulted in higher CPR performance compared to flipped learning. In mental health first aid, Reavley et al. (2021) found that both blended and eLearning formats led to long-term improvements in knowledge and intentions to help, with blended courses showing superior outcomes.

Digital technologies in health management

Saeidnia et al. (2022) found that mobile apps could improve self-care skills in health management, particularly in underdeveloped countries. Myers et al. (2021) emphasized the benefits of online CPR training to increase accessibility. Yousefian and Mohamadirizi (2023) recommended the Information-Motivation-behavioural Skills (IMB) model to enhance CPR self-efficacy among high school students.

Basic life support

The Education, Implementation and Teams Taskforce of ILCOR performed a systematic review in 2024 on the topic of self-directed digital-based training versus facilitator-led CPR training in adults and children (Eastwood et al., 2024) . They suggested that either is appropriate for training CPR or AED skills in people aged 10 and above. They suggested using self-directed digital training when facilitator-led training is not accessible, or when quantity over quality is required. A 2022 scientific review on the topic of blended learning revealed mixed findings regarding the effectiveness of facilitator-led and blended approaches in terms of skills and knowledge. This led to their recommendation of a blended learning approach where resources and accessibility permit (Lockey et al., 2022).

Conclusion

While digital learning tools show promise in improving health-related knowledge and skills across diverse populations, results for skill development are mixed. Blended learning approaches, combining online and face-to-face methods, emerge as the most effective strategy. The research underscores the potential of digital learning to increase accessibility and scalability of health education, particularly in underserved areas or during pandemics. However, limitations in virtual skill assessment highlight areas for further research and improvement in online health education methodologies.

Mass social media

Key action

Use various forms of communication to increase public awareness about first aid competencies and normalize positive attitudes and beliefs around emergency response and to encourage individuals to acquire or refresh their understanding of first aid principles and techniques.

Introduction

This section addresses both traditional media (such as television, radio, newspapers and internet/websites) and new media (such as social media applications, platforms utilizing short-form video content and text message-based engagement systems). Traditional and new media can be a cost-effective way to spread first aid information widely and provide educational information to diverse audiences, from individuals and local communities to global populations.

When selecting a media outlet for the distribution of first aid information, two critical factors are considered:

1. Accessibility: The chosen media platform must be readily available to the target audience.
2. Frequency: It should be one that the intended recipients frequently use.

The information conveyed through these media channels should adhere to the following standards:

1. Authenticity: The content must be factually accurate and reliable, ideally evidence-based. Engage subject matter experts to provide targeted information through appropriate media channels.
2. Relevance: The information should be relatable to the target audience's needs and cultural context. Use real-life accounts from individuals who have been influenced by first-aid media content to encourage behavioural change in others.
3. Engagement: The presentation of the content should be captivating and maintain the audience's interest.
4. Educational value: The material should impart relevant knowledge and skills related to first aid practices.

Guidelines

- Mass media should be considered for enhancing first aid awareness and the timely, rapid distribution of clear first aid messaging, such as during or in advance of emergencies.*
- Mass media could be used to stimulate learning motivation by highlighting the necessity, potential risks for the first aider and benefits of learning first aid.*
- First aid programme designers should carefully consider the appropriateness of media types for the particular topics, lessons or messages they wish to convey.*

Good practice points

- Prioritize simplicity and clarity, incorporating textual and visual elements when feasible. Content should be engaging and educational.
- Use mass media to offer “lower dose, higher frequency” learning opportunities to enhance learner confidence and increase the likelihood of individuals helping. Develop engaging media content using innovative approaches, such as incorporating popular trends to increase visibility and shareability.

Chain of survival behaviours

Media platforms can play a crucial role in supporting the "prevent and prepare" domain. Specifically, media can be an effective tool for:

1. Raising public awareness: Media channels can spread information about potential health and safety risks, educating the general population about common emergencies and their prevention.
2. Communicating appropriate responses: Through various media formats, organizations can inform the public about the correct actions to take in different first aid scenarios, thereby improving overall emergency preparedness.

Education considerations

Context considerations

Media selection and message tailoring

- Choose media outlets that align with your target audience's preferences and use.
- Adapt your message format to suit the selected platform. For instance, use storytelling for radio broadcasts or create short, engaging video clips for social media platforms like TikTok.
- Consider whether your message will be consumed proactively or reactively, as this will influence the depth and detail of the content.
- Increase visibility by asking members of your organization to follow the conversations on social platforms and be prepared to engage with users and respond to questions.

Cost-effectiveness and reach

- Evaluate the cost and reach of different media outlets to optimize your resource allocation.
- Find a balance between the need for broad reach and targeted messaging for specific audiences.

Cultural sensitivity

- Tailor your messaging approach to align with cultural preferences for information sharing.
- Be mindful of cultural nuances and adapt your content accordingly.
- Include the intended audience in the development of key messages and content to ensure cultural appropriateness and resonance.

Strategic timing and creativity

- In media-saturated environments, carefully consider the timing and delivery of your key messages.
- Employ creative strategies to capture attention and stand out from competing information.

Integrated approach

- Combine media messaging with other initiatives to influence policies and practices in your region.
- Use a mix of traditional and modern communication channels, including text messaging, news outlets, radio, social media and online learning platforms.
- Be aware that the effects of a media campaign may lessen once it is over (Eppler et al., 1994), so consider ways to share messaging and frequently engage with your audience.

Collaboration with journalists

- Leverage daily news coverage of first aid emergencies by providing informative content to journalists.
- Offer relevant preventive actions and first aid steps to enhance the educational value of news stories.

Literacy and comprehension

- Consider the target population's general literacy level as well as their health literacy. These factors should inform the complexity of the language used and the depth of explanations provided.

Facilitation tips

- Always ensure the accuracy and credibility of the source of your media content before sharing and provide proper attribution to the original creator.

Scientific foundation

Effectiveness of media campaigns

Several studies have assessed the impact of media campaigns on awareness and knowledge of life-saving practices, such as CPR.

- Meischke et al. (1999) found that a 30-second public service broadcast significantly improved CPR knowledge and awareness but did not influence participants' intent to perform CPR.
- Benoit et al. (2017) reported that a brief CPR training video displayed in a hospital waiting room (passive exposure) improved CPR skills (e.g. compression rate and depth), but lacked real-world behaviour testing.
- Becker et al. (1999) noted a significant increase in bystander CPR following public service announcements on television; however, they did not assess CPR quality or long-term effects.

- Luepker et al. (2000) found that an 18-month multimedia campaign increased the use of emergency medical services and public knowledge about heart attack symptoms, but did not significantly change actual CPR behaviour.

Tailored messaging and demographics

Tailoring educational messages to specific audience demographics can enhance effectiveness.

- Alruwaili et al. (2024) found that burn care knowledge in Saudi Arabia varied by gender, age and education. Tailoring messaging to these factors improves engagement and learning.
- Farquharson et al. (2022) demonstrated that text messages sent after CPR training can enhance intentions and self-rated competence in performing CPR, addressing barriers such as low confidence and emotional responses.

Text and digital media communication

Text messaging and digital platforms are increasingly used to share public health information.

- Menn et al. (2021) found that text message emergency notifications, especially when combined with other communication methods, are effective in rapidly distributing safety messages and engaging diverse audiences.
- Bashekah et al. (2023) highlighted the growing role of social media in first aid education but stressed the need for accurate information and clear, simple messaging, especially when using visual formats.

Challenges and limitations of media campaigns

Media campaigns often face challenges in sustaining long-term behaviour change.

- Leavy et al. (2015, 2016) reviewed drowning prevention campaigns and found varied outcomes, cautioning against relying on a single approach. They identified a gap in research on multi-strategy water safety education.
- Eppler et al. (1994) noted that the effects of media campaigns diminish after they end, highlighting the importance of continued engagement, such as by creating new content on social media.

Misconceptions from media representations of first aid

Media depictions can contribute to misconceptions about first aid practices.

- Alismail et al. (2018) and Colwill et al. (2018) pointed out that television often portrays unrealistic CPR outcomes, such as spontaneous breathing after a brief period of CPR, which can mislead viewers about the duration and effectiveness of CPR.

Conclusion

Media campaigns can effectively raise awareness and knowledge of life-saving practices, such as CPR, but their impact on actual behaviour is less consistent. Tailored, text-based messaging can enhance long-term engagement, while challenges such as post-campaign engagement and media inaccuracies remain. Multi-modal, sustained campaigns that provide clear, accurate information are recommended for improving public health outcomes.

Feedback devices for education

Key action

When implemented effectively, feedback devices enhance the experience of first aid education.

Introduction

High-quality instructors and educators provide feedback in most educational contexts. Feedback devices and activities can supplement or replace instructors in some of those contexts. Feedback devices are tools that provide auditory, visual or physical cues to learners, helping them develop first-aid competencies. The most common use of feedback devices occurs in resuscitation skills training. These devices have evolved significantly since the 1960s, with the integration of augmented reality (AR) and virtual reality (VR) technologies, offering more immersive and interactive learning experiences both in and outside the classroom. Gamification can extend feedback to include behaviours and attitudes.

Gamification is the introduction of game elements (e.g. collecting achievements, earning points or team play) to first aid education to increase learners' engagement and develop competencies. An example of this is a mobile application that tests the ability to assess various scenes for hazards. Gamification in both electronic and physical (non-electronic) forms can captivate learners' interest, provide feedback and offer opportunities to re-engage with the content. Given the increased popularity of mobile technology, electronic gamification can potentially reach a much broader audience with fun, engaging and effective first-aid education, although traditional games that do not use technology can also be effective.

Guidelines

- Incorporate feedback devices as a standard component of cardiopulmonary resuscitation (CPR) training programmes for healthcare professionals and lay rescuers.**

Good practice points

- Provide comprehensive instruction on the correct use of feedback devices to ensure trainees can effectively interpret and respond to the feedback provided.
- Include training sessions both with and without feedback devices to ensure rescuers can perform high-quality CPR independent of technological assistance.
- Regularly review CPR performance data collected from feedback devices to identify areas for improvement and tailor training accordingly.
- Implement regular refresher training sessions using feedback devices to maintain and improve CPR skills over time.
- Devices should be appropriate to how learners can or prefer to receive information.
- Devices may be used in remote or distance learning situations or for self-study.
- Gamification may be used to deliver first aid content either independently or as part of a comprehensive educational strategy.
- Gamification should be purposeful and supported by an educational approach that clearly identifies its benefits in relation to the intended learning outcomes.

- Gamification tools should respect cultural norms and not trivialize life-threatening scenarios.

Chain of survival behaviours

Prevention and preparedness

While feedback devices are not typically used for teaching prevention strategies, training programmes could incorporate simulations that use feedback devices to help learners identify potential hazards and practise preventive measures related to scene safety to develop their preparedness.

Early recognition

Feedback devices can be used to train individuals to recognize signs of life-threatening conditions (e.g. abnormal breathing patterns or absence of breathing) while providing feedback on the speed and accuracy of assessment.

First aid

This domain is where feedback devices can have the most significant impact:

- CPR training: Feedback devices are particularly useful for teaching high-quality CPR (compression depth, rate, recoil and hand placement).
- AED training: Devices that simulate AED use and provide feedback on pad placement and timing of shocks can enhance learners' confidence and competence.
- Choking management: Feedback devices could be developed to help trainees practise the correct technique and force for back blows and abdominal thrusts.

Accessing help

While this domain primarily focuses on decision-making and communication skills, gamification can be incorporated into scenario-based training to help learners perform concurrent actions (e.g. calling emergency services while applying pressure to a wound) and provide feedback on the clarity and completeness of the information provided to emergency dispatchers.

Self-recovery/early medical care

Feedback devices in this domain could focus on:

- Training for proper casualty positioning, using devices that provide feedback on the correct angle for recovery positions.
- Simulations for ongoing assessment of a casualty's condition, using devices that offer feedback on the frequency and accuracy of checks.

Education considerations

Context considerations

- Feedback devices may add to training costs, making them less suitable for just-in-time learning or in areas with limited resources. Free first aid apps may be available as an alternative.

- Feedback devices may provide effective learning opportunities when a facilitator is absent (such as during pandemic isolations). However, they may be less effective in contexts where learners respect or expect facilitator-led programming.
- Virtual reality (VR) or augmented reality (AR) can be used to develop levels of stress (beneficial stress) to support learning.
- Games can be used in learning across high- and low-resource settings. Consider how the educational setting (face-to-face or online) may influence the types of games that can be used. Also, consider how feedback can be effectively incorporated into these games, for example, scoring points for putting first aid steps into the correct sequence.

Learner considerations

- Consider the learner audience and their learning context (e.g. devices that may work for first aid providers may not meet the needs of professional responders).
- Feedback devices should be selected based on the outcomes that best serve the learners' needs (e.g. selecting a device that provides visual feedback may be more suitable for learners with hearing difficulties).
- While feedback devices offer numerous benefits, it is crucial to consider their impact on cognitive load during the learning process. Some studies suggest that novice learners may experience increased cognitive load when first introduced to these devices, which could potentially impact their initial performance (Jeffers et al., 2022; Sweller et al., 2011). Curriculum developers should be mindful of this and consider strategies to gradually introduce feedback devices to minimize cognitive overload.
- Be aware that VR or AR could be a trigger for recalling previous trauma or phobias.

Facilitation tips

- Provide a brief overview of the topic and then introduce learners to the technology before they begin using the feedback device.
- Train facilitators to set up the device or game, introduce it to learners, monitor and support the feedback provided, and resolve any technical difficulties.
- Make use of games or feedback devices to motivate learners to perform an action or behaviour again and again to improve performance through repeated use.

Facilitation tools

- Choose feedback devices that have demonstrated efficacy in improving CPR quality through rigorous scientific evaluation.
- Select devices that are compatible with existing equipment and can be easily integrated into current CPR protocols.
- Conduct thorough cost-benefit analyses when considering the implementation of feedback devices, taking into account potential improvements in CPR quality and patient outcomes.

Scientific foundation

The use of feedback devices in CPR training has been the subject of several studies, revealing significant themes regarding their effectiveness and impact on skill acquisition and performance. A prominent finding across multiple studies is the marked improvement in CPR quality when feedback devices are employed during training and actual performance. The

International Liaison Committee on Resuscitation (Lin et al., 2023) reaffirmed its treatment recommendation based on a systematic review and meta-analysis for the use of feedback during training.

Wutzler et al. (2018) demonstrated a substantial increase in the percentage of optimal compressions from 14.6% without feedback to 58.9% with a feedback device. Similarly, Yeung et al. (2009) and Zhou et al. (2020) reported enhancements in compression depth, rate and hand positioning when feedback devices were utilized.

Effectiveness of real-time feedback

The role of feedback devices in skill acquisition and retention is another crucial theme emerging from the research. Yeung et al. (2009) found that these devices facilitate better initial skill acquisition compared to traditional training methods. While short-term skill retention appears to improve with the use of feedback devices, Zhou et al. (2020) noted that the long-term retention benefits are less definitive, suggesting an area for further investigation.

Real-time feedback devices have shown significant promise in improving the quality of CPR performance. Studies indicate that these devices can enhance compression depth, rate and overall CPR quality (Alcázar Artero et al., 2024; Cortegiani et al., 2017; Liyanage et al., 2019; Suwanpairoj et al., 2020). The immediate nature of the feedback enables trainees to make real-time adjustments, resulting in more effective skill acquisition and retention.

Virtual reality (VR) simulations for CPR training

Several studies have explored the use of VR technology to create immersive CPR training experiences (Arthur et al., 2023; Buttussi et al., 2020; Cheng et al., 2024; Hubail et al., 2022; Jeffers et al., 2022; Leary et al., 2020; Liyanage et al., 2019). These VR simulations aim to provide realistic practice environments. The VR systems can track user movements and provide feedback on compression depth, rate and other CPR metrics.

Impact on skill retention

Research suggests that the use of feedback devices during training can lead to improved skill retention over time. Learners who utilize these devices during practice sessions demonstrate better performance in follow-up assessments compared to those trained without such devices (Yeung et al., 2009). This finding has important implications for the design of first aid training programmes, suggesting that incorporating feedback devices may lead to more lasting skill acquisition.

Transferability of skills

An important consideration is the transferability of skills learned with feedback devices to real-world scenarios where such devices may not be available. Research findings are mixed on this point, with some studies suggesting good skill transfer (Yeung et al., 2009), while others indicate potential over-reliance on the devices (Cortegiani et al., 2017). This highlights the need for balanced training approaches that incorporate both device-assisted and traditional methods.

The effectiveness of feedback devices in training laypersons has been highlighted in several studies (E. Aksoy, 2019; Ohle et al., 2021; Wutzler et al., 2017). There have been reported significant

improvements in CPR performance by lay rescuers when using feedback devices; however, the type of device plays a role. This finding is particularly relevant as it suggests the potential for Do-it-Yourself (DIY) devices to increase the accessibility of CPR training, especially in resource-limited settings (Ohle et al., 2021; van Duijn et al., 2024).

Despite the evident benefits, some studies noted potential limitations of feedback devices. Yeung et al. (2009) raised concerns about the potential over-reliance on devices during training and mixed results for more complex skills, such as bag-valve-mask ventilation. They also emphasized the importance of device calibration on various surfaces, such as floors versus mattresses, to ensure accuracy.

Cost-effectiveness and accessibility

The implementation of feedback devices in training programmes raises questions of cost-effectiveness and accessibility. While these devices can enhance training outcomes, their cost may limit widespread adoption, particularly in resource-constrained settings (Yeung et al., 2009). Educators and curriculum developers should consider the balance between the potential benefits and the practical constraints of implementing these technologies.

Instructor role and guidance

The introduction of feedback devices does not diminish the importance of skilled instructors. Research indicates that the most effective training outcomes are achieved when feedback devices are used in conjunction with expert guidance (Cortegiani et al., 2017). Instructors play a crucial role in interpreting the feedback, providing context, and guiding learners in applying the information to improve their performance.

Romero et al. (2006) developed an adaptive web-based training simulator for cardiac life support that personalized content and difficulty based on the learner's performance. The system used artificial intelligence techniques to adapt the training experience to each user.

Cross-reality elements

There is limited evidence in favour of using cross-reality elements for learning. A longitudinal prospective study was conducted in two high schools, comparing two mobile phone apps: a cross-reality partner game and an information-based application. The partner game resulted in a statistically significant increase in learners' ability to predict their actions and in their confidence to act, compared to the information-based application. The study also showed that using animations as a feedback device can help learners achieve the intended learning outcomes (Semeraro et al., 2017). Self-efficacy toward "taking responsibility to intervene" led to bystander actions in a VR simulated emergency (Buckler et al., 2019).

Points system

There is some evidence in favour of using a points system where learners earn points by completing activities on a mobile phone app. A randomized controlled trial showed that such a method resulted in a statistically significant increase in knowledge scores, compared to a version of the mobile app without the point system (Burgess et al., 2018). Mini games that provide feedback messages and points were found beneficial for learning first aid for choking (Boada et

al., 2020). Scoring by device is more nuanced than by instructor observation, which, when combined, may be more helpful to learners (M. E. Aksoy, 2020).

Face-to-face facilitation and a mobile app

There is limited evidence in favour of combining in-person facilitation with a mobile phone app. A randomized controlled trial conducted in a school showed that when an app supported in-person facilitation, there was a statistically significant increase in CPR assessment and achievement scores compared to either method alone. However, the app method alone did not result in a statistically significant difference in compression rate and showed a statistically significant decrease in correct compression depth when compared to in-person facilitation (Yeung et al., 2017).

Using games for knowledge development

Akaltan et al. (2023) identified increased knowledge, but no difference in skills between groups using serious games and instructor-led Basic Life Support (BLS) courses. A grey literature report on the development and trial of a water safety app for children (aged 13–14) demonstrated that the app is an effective means for knowledge development when compared with facilitator-led learning (Life Saving Victoria, 2016). The app guides students through mini-games that educate them on how to keep themselves and others safe during an Emergency Action Plan. Similarly, knowledge increased around microbes and infection prevention through the use of small games, along with reporting of an enjoyable experience (Eley et al., 2019).

Computer game versus DVD-based learning

Finally, a military-based randomized controlled trial showed no significant difference between a computer game (a 3D video, known as a “serious game”) and a DVD-based learning intervention. However, the authors concluded the game could be more engaging (Planchon et al., 2018).

Peer learning

Key action

Use peer-to-peer learning activities to foster additional perspectives, promote cooperation and encourage learners to engage more with the content to add value to the educational outcomes.

Introduction

Peer learning is a term that has many interpretations and includes a wide variety of learning approaches. It has no universally agreed-upon definition, and there is no standard method for its delivery. Related terms for this approach include co-learning, cooperative learning (peer-to-peer), peer tutoring, peer-led instruction, peer evaluation, peer coaching and reciprocal learning.

A "peer" is defined as someone from a "like-group" who shares some (or all) of the following characteristics: gender, age, cultural background, religion or socioeconomic circumstances. Peer learning is often used with young people or other specific audiences who may not recognize themselves (or their values and experiences) in a traditional facilitator. The familiarity of a peer can create confidence, as well as new opportunities to share knowledge or change behaviour because the relationship is often based on trust and openness. It is especially beneficial to reach audiences who may be underserved by traditional forms of education.

Good practice points

- Peer-led or cooperative learning strategies can be effective tools for teaching first aid knowledge, skills and attitudes.
- The choice of strategy may depend on factors such as the novelty of the curriculum, the level of relevant knowledge peers can offer, available time and financial resources.
- While peers can add significant value to the learning process, they should not replace qualified professional facilitators.
- The peer-to-peer dynamic should enhance the learning experience, providing mutual benefits for both learners and peer facilitators.
- To ensure effective peer leadership, it is important to establish standardized training and evaluation methods.

Chain of survival behaviours

Peers can support the development of survival behaviours by sharing relevant context, knowledge and skills, such as:

- Preparation and prevention: Strategies they have used to prepare for emergencies in familiar settings like work, school or home.
- Early recognition: Signs or indicators that helped them recognize emergencies early in those contexts.
- Providing first aid: Examples of improvised materials they have used to give care, and how they coached peers during practice sessions.

- Accessing help: Information about community or workplace resources that can assist with emergencies.
- Self-recovery: Actions to care for peers or support others during or after an emergency event.

Education considerations

Peer learning has the potential to shape learners' attitudes and values, including their willingness to act in emergency situations.

Context considerations

- Peer learning often requires minimal financial and human resources. However, training peer facilitators to be effective can take time and effort.
- Peer learning approaches are beneficial in communities with limited access to the internet or digital devices.
- Educators should consider cultural, gender and religious sensitivities when designing and facilitating peer-based learning experiences.

Learner considerations

- Peer learning is mostly used with youth (aged 10–25), especially in schools where large groups of learners share common experiences and peers can take on leadership roles.
- Peer learning can be effective for various audiences who benefit from shared experience or connection, including:
    - young children (pre-school and elementary)
    - older adults
    - groups with shared life circumstances (e.g. new parents, caregivers, homeless individuals, those with substance use challenges, etc.)
    - people living in similar environments (e.g. rural, remote or conflict-affected areas)

Programme designers should provide ongoing support to peer facilitators, not just during initial orientation. This continued support is essential to keep them motivated and ensure consistent, high-quality learning experiences.

Facilitation tips

- Involve peer facilitators early: Engage peer facilitators in programme planning to ensure the approach and content resonate with the intended audience.
- Choose facilitators carefully: Ideal peer facilitators may be previous trainees or individuals recommended by trusted community leaders.
- Encourage sharing: Encourage learners to share their newly gained knowledge, skills and attitudes with others in their peer group (e.g. family, friends, co-workers).
- Prioritize hands-on learning: Include time for tactile, hands-on learning where learners observe and support one another to improve their technique.

Facilitation tools

- Paired learners can follow instructions from a facilitator, then work together to apply what they have learned.

- After learning a skill (e.g. steps to perform first aid), peers can coach each other through the process.
- Peers can brainstorm emergency preparedness strategies or develop a case study based on shared experiences.
- Feedback from a peer tends to feel more personal and ongoing compared to automated devices, which provide standardized responses.
- Some aspects of peer learning can also be delivered online, including through educational games or interactive platforms.

Scientific foundation

This review examined how peer learning affects both learners and those receiving care, compared to traditional education methods or no training at all. Rather than assessing whether peer learning is better, the goal was to explore how it performs in comparison to other strategies.

Peer-led learning

Four studies are included which consider peer-led learning in comparison to teacher or instructor-led training.

Beck et al. (2015) studied peer-led Basic Life Support (BLS) training among middle school students in Germany. The aim was to compare peer-led training with instruction by a professional facilitator. Peer facilitators prepared in advance, and two independent evaluators used a standardized checklist to assess performance. Results showed a 40.3% success rate in the peer-led group and a 41% success rate in the professional-led group. However, concerns were raised about the selection of peer facilitators who were often high-performing students. The study did not explore how the relationship between peer educators and learners might have influenced the results.

Wik et al. (1995) examined a “trickle-down” peer training model among Norwegian factory workers, in which factory employees received cardiopulmonary resuscitation (CPR) training (Tier 1), then trained co-workers (Tier 2), who in turn trained family members (Tier 3). In total, 1,303 people were trained: 41 in Tier 1, 311 in Tier 2, and 873 in Tier 3.

Three weeks after each tier group had received training, all tiers demonstrated their skills using feedback mannequins. Results showed Tier 3 learners (taught by non-professionals) performed comparably to a US control group trained directly by professionals. However, cross-country differences between the intervention (Norway) and control (US) groups may have influenced the outcomes.

Damvall et al. (2022) evaluated the effectiveness of student instructors teaching CPR to their peers in a high school setting. Seventy-six student instructors (SIs) from three high schools received a two-day training course from professional instructors, which included theoretical learning via an e-learning programme. The student instructors then led 90-minute practical CPR sessions for approximately 2,650 students during physical education classes.

CPR performance was assessed using four-minute practical tests on Little Anne QCPR mannequins. Data from 982 students were analysed. The compression rates were within guideline recommendations for SIs (mean 110.6; SD 5.4) and students (mean 118.6; SD 8.6). The corresponding numbers for mean compression depth were 7.2 cm (SD 0.7) and 7 cm (SD 1.0). Students demonstrated greater variation in mouth-to-mouth (MTM) skills, with only 41% performing at least 15 successful ventilations during the test. Except for the total number of MTM ventilations (mean difference -5.6), CPR performance was deemed statistically equivalent between professional instructors, SIs and students.

Allan et al. (2023) compared CPR metrics immediately post-training in children who were trained by peers versus those who received traditional instructor-led training. In all five studies, students were taught by peers, which included hands-on practice. No differences were observed when comparing the proportion of children performing correct depth, rate and hand position in compressions immediately post-training between those who received peer-training and those who received traditional instructor-led training. No retention or self-confidence data were available for comparison from the RCT.

Co-operative learning

Three studies examine peer-to-peer learning, where peers support one another following instruction from experts.

Iserbyt et al. (2009) investigated reciprocal learning with peer evaluation. Students were divided into pairs where one performed CPR tasks while the other was the helper, observing and providing feedback. Roles switched every five minutes. The intervention group included peer evaluation, while the control group did not. Both groups took a retention test two weeks later. Results showed that more students in the peer-evaluation group completed CPR steps in the correct order. No other significant differences were found. This suggests peer evaluation can strengthen learning by encouraging both observation and feedback. Learners co-constructed knowledge through discussion, analysis and active involvement.

Charlier et al. (2016) studied peer-assisted learning with master's students in education. Participants were first introduced to CPR by experts or instructional tools. They then paired up to teach each other sections of the content. The control group spent the same time practising bandaging. Outcomes were based on practical assessments and showed that peer-assisted learning was as effective as traditional instructor-led approaches in meeting the European Resuscitation Council's 2010 CPR quality standards.

Knowlin et al. (2023) conducted a pilot study using virtual reality (VR) CPR training in high schools with a near-peer mentoring approach, with students divided into pairs. In 1.5-hour sessions, one student practised CPR on a mannequin guided by a VR avatar while the other took notes and provided coaching. Roles were then reversed. Each student's CPR skills were assessed in VR using a cardiac arrest avatar superimposed on a real QCPR mannequin, with coaching from their peers. Students then switched roles and debriefed on their experience. The trial showed students performed well and valued the collaborative learning approach.

Knowledge gaps and future research

Further research is needed to understand how peer learning can support first aid education across diverse settings. Programme designers are encouraged to explore projects that could strengthen the evidence base for future guideline updates.

Key questions for future study include:

- How does peer learning perform in training that leads to certification, compared to non-certified sessions?
- What is the impact of peer learning on populations beyond youth, such as older adults, families, people affected by opioid poisoning or other health risks?

Video facilitated learning

Key action

Consistently and effectively support both facilitator-led and self-paced learning by providing learners with videos that demonstrate and apply key skills.

Introduction

Video-based learning involves individuals watching a video to build competencies on a topic. This method provides an effective way to communicate a consistent message to audiences. There are two main approaches to video learning:

1. Observation: Learners watch a video to gain knowledge.
2. Active participation: Learners practise alongside a video to develop their competencies.

Guidelines

- Videos can be a highly effective tool for learning and practising cardiopulmonary resuscitation (CPR) if learners have access to a mannequin.*
- Videos can motivate learners to act in an emergency, such as starting CPR or providing other first aid care.*
- While facilitator-led training is generally more effective, video learning can complement and reinforce facilitator-led instruction.*

Good practice points

- Video as a supplement: Video-only learning is particularly useful when facilitator-led training is not possible or when it serves as a supplement to facilitator-led training to maintain consistency. Videos should provide clear and concise explanations of first aid techniques. Subtitles and captions can be helpful to certain populations.
- Contextual learning: Videos can include realistic simulations of emergency situations to help learners prepare for real-world scenarios. The videos can help learners visualize emergency scenarios, providing context for the first aid skills being taught, and can be adjusted to the learner's context. Virtual reality or 3D videos can provide a more immersive and engaging learning experience.
- Focus on one skill: Videos that focus on teaching a single skill set (e.g. CPR, bandaging) tend to be more effective.
- Self-paced training: Video-based training is a good option for non-medical staff to learn and reinforce basic skills and knowledge at their own pace.
- Refresher training: Video learning is especially beneficial for refresher courses, particularly for learners in remote areas or communities with limited access to in-person training.

Chain of survival behaviours

Video learning is most effective for teaching the first three steps of the CoSB

1. Prevention and preparation
2. Early recognition of an emergency
3. Immediate first aid

It is particularly helpful in reinforcing the recognition aspect, such as identifying when CPR is needed.

Educational considerations

Context considerations

- Changing learning opportunities: As technology evolves, so do learning opportunities. Video-based learning can be an effective alternative for individuals who are unable to attend in-person training sessions.
- The role of social media and online learning: Educators are increasingly using social media and online platforms for teaching. As a result, the role of video has expanded. Consider which platforms your audience use most often to consume content, and tailor your first aid training videos to meet their preferences.

Learner considerations

- The format, content and teaching methods (pedagogy) of the video must be appropriate for the intended audience.
- For children with intellectual or developmental disabilities, video can be a powerful tool for teaching single-step interventions.
- Images and animations help illustrate first aid concepts and techniques in a clear and engaging way, helping learners to absorb information more quickly and effectively. Additionally, emotionally charged content can stimulate imagination and creative thinking, leading to a deeper understanding of the material.

Facilitation tips

- Complement, do not replace: Use video learning to support in-person facilitation, but not as a replacement. The exception would be in cases of refresher training or when face-to-face learning is not feasible.
- Active practice: Ensure that learners have the opportunity to practise what they observe by pausing the video. Hands-on application is key to reinforcing the skills demonstrated.
- Bridging self-led and facilitator-led learning: Prepare facilitators to connect self-paced video learning with supervised training. The facilitator's role should be to build on the skills learners have acquired independently, rather than merely repeating the content shown in the video.
- Evaluate videos regularly to ensure they are effective and meet the needs of learners.

Facilitation tools

- Use short videos for impact: Even brief video clips (up to four minutes) can significantly improve learners' skills and increase their awareness.
- Incorporate testimonials: Testimonials from medical or first aid professionals, as well as individuals with lived experiences, can be used to provide real-world tips and insights.

Scientific foundation

Fourteen studies were included with findings across several relevant themes for this topic. Heard et al. (2019) compared the effectiveness of video, short online tutorial and facilitator-led learning in teaching CPR. The video group was the least effective, while the online group outperformed the facilitator-led group on hand positioning but scored lower on compression depth. Godfred et al. (2013) highlighted the impact of video length, showing that longer CPR videos resulted in higher competence levels. In another study, Bylow et al. (2019) noted that while facilitator-led training yielded greater immediate knowledge gains, long-term performance at six months was similar across both self-led (video) and facilitator-led groups.

Further investigations underscore the nuanced role of video in learning contexts. Lawson et al. (2012) found that video significantly improved knowledge retention in a children's water safety programme, while Sureshkumar and Zonneveld (2024) demonstrated the effectiveness of telehealth for teaching first aid to children with intellectual disabilities. This was particularly successful when teaching one skill at a time using limited steps. Beskind et al. (2016) compared a short video learning with a 20-minute hands-on facilitator-led session. They found that the quality of CPR and responsiveness of the high school students participating in the study improved significantly with the video cohort, but that compression depth was only improved by the hands-on cohort. De Vries et al. (2010) affirmed that while DVD training improved retention, it could not match the effectiveness of traditional facilitator-led instruction. Chung et al. (2010) found no significant differences between video-only and face-to-face facilitation, suggesting that context-based variability exists. Additionally, Ali et al. (2019), Eisenberg et al. (1995), Capone et al. (2000), Salehi Karizmeh et al. (2023), Nishiyama et al. (2009), and Blanchard et al. (2022) contribute to a growing body of evidence highlighting the complexity of effective training methodologies in CPR and first aid education.

Overall, while video can be a valuable educational tool, it is most effective when paired with active facilitation, particularly for complex skills that require nuanced understanding and practice. Furthermore, the studies emphasize the roles of instructional quality, video length, the opportunity to practise and learner characteristics in achieving desired outcomes. Gaps exist around video learning for first aid topics other than CPR.

Refresh and retrain

Key action

Provide opportunities for learners to maintain their knowledge, skills, decision-making abilities and intention to help after completing an initial first-aid education session.

Introduction

"Refresh" refers to strengthening or reminding learners of first aid competencies. "Retrain" refers to individuals demonstrating first aid competencies following an initial educational experience, typically for certification purposes. Currently, there is no agreed-upon definition of what refresh and retrain efforts should consist of—they can include any type of learner engagement following the initial training (e.g. self-directed learning, peer-led learning or instructor-led learning). They can take many different forms, such as face-to-face, online, video learning, print (e.g. posters, pamphlets, flashcards), or a combination of these. A refresh and retrain strategy supports learners in maintaining their first aid competencies over time.

This topic requires further evidence on the best ways to refresh and retrain, as well as the frequency of retraining different learner groups.

Guidelines

- Knowledge and skill abilities decline dramatically in the months following an initial first-aid learning experience. Programme designers should use this evidence to encourage individuals to regularly engage in first aid learning.**
- Refresh and retrain strategies should be considered to maintain first-aid learning outcomes.**
- All methods reviewed in the scientific foundation section (video learning, feedback devices, face-to-face learning, etc.) may be considered as appropriate refresh and retrain methods.*
- Refresh and retrain sessions may be delivered between three to six months after the initial educational experience. Waiting longer will lead to less effective retention of learning.*
- While there is no recommended session length, refresh and retrain interventions of up to 45 minutes could be valuable.*

Good practice points

- Programme designers should work with different learner groups and policymakers to develop the most suitable refresh and retrain strategy and delivery method.
- First aid volunteers should also take refresh and retrain sessions to ensure their knowledge and skills are up to date.
- Repetition of learning can help to develop and retain knowledge. Although the optimum frequency is unknown, annual refreshers over three years could be sufficient for long-term skill retention for children.

Chain of survival behaviours

Refresh and retrain methods can be applied to all domains of the CoSB. For example, evidence shows that technical aspects, such as correct compression depth and rate, can improve with practice but will quickly worsen without it. Refresh and retrain methods also build confidence and a willingness to act, helping learners achieve the desired outcomes within each domain successfully.

Educational considerations

Context considerations

- Local requirements: Be aware of your organization's and country's rules for refresher and retraining sessions. This includes understanding the qualifications needed and how certifications are issued. For example, some places only require documentation that a person has provided first aid and a formal retraining session is not required.
- Technology barriers: Using technology for refresher sessions can help reach a larger audience, but remember that in some areas, not everyone has access to high-speed internet or devices such as mobile phones or computers. However, offline technology can still be useful for people in these areas to learn first aid.
- Travel distance: If offering face-to-face training, consider the distance learners may need to travel and plan accordingly to make attendance easier for them.
- Focus on common injuries: Review local health data to understand which injuries occur most frequently in the area. This can help you decide which first aid topics should be prioritized in retraining sessions.

Learner considerations

- Different learning needs: Each group of learners may need different approaches for refresher and retraining sessions. For example, you may need a different teaching style for younger learners compared to adults, older adults or families. Consider each group's unique learning needs.
- Inclusive learning: Offering different ways to refresh and retrain first aid skills can make the process more inclusive and accessible to a wider range of learners.
- Refresher sessions for trainers: Trainers also need to refresh their skills and ideas for training. Meet regularly to foster a culture of sharing new ideas, collectively updating on available resources and materials, addressing any concerns, and seeking support on specific topics.

Facilitation tips

- Timing of refresher sessions: Plan refresher sessions about three to six months after the initial training to help learners retain what they have learned. However, if this time frame is not possible, research shows that even if more time has passed (like a year), knowledge can still be refreshed.
- Easy access to information: Provide learners with simple, appealing ways to access first aid information and remind them of the importance of keeping their skills up to date.

- Reminder methods: Ask learners how they prefer to be contacted so you can send reminders to update their first aid knowledge. You could communicate through email, text message, or social media.
- Peer support: Consider using peer-to-peer communication through social media to share first aid updates and encourage others to refresh their skills.
- Different approaches for refreshers: People who need retraining may need to review basic concepts they have forgotten, while those just refreshing their skills might benefit more from advanced activities or real-life scenarios that build on their past experience.
- Motivate learners: Use motivational events, such as competitions, to encourage learners to regularly maintain and refresh their skills.

Facilitation tools

- Variety of learning tools: There is no single "best" method for refresher and retraining sessions, but tools like in-person courses, video tutorials and animations can help improve knowledge and skill retention.
- Digital methods: Digital tools like text messages or emails with first aid tips can be a cost-effective way to help learners refresh their skills regularly. Similarly, there are free first aid apps that learners can use to refresh and update their knowledge.
- Face-to-face sessions: In-person learning can also be an effective way to help learners retain their knowledge and skills.
- Games for learning: Simple games or card-based activities are a fun and engaging way to reinforce first aid knowledge.

Benefits and limitations

- Costs: Developing refresher and retraining programmes can be expensive, depending on the delivery method. However, shorter, more frequent sessions can be more affordable and still help learners keep their skills over time.
- Learner motivation: Some learners may feel they do not need a refresher, especially if too much time has passed since their original training. The longer the gap between training and refresher sessions, the harder it may be to convince people to update their skills. On the other hand, some learners may appreciate regular refreshers, as it means they will not need to take longer courses as often.

Scientific foundation

We included studies focused on enhancing CPR education through simplified algorithms, mobile technology and retraining methods. The studies we found did not cover a broader range of first aid skills, nor did they consider the complexity of the different skills and knowledge points needed for an intervention. These factors may influence how different engagement methods are best suited to refresh or retrain efforts. Furthermore, the studies do not consider that there could be a difference between optimal performance and other degrees of performance (or use of practice) and there is a lack of consensus throughout the studies on what level of performance and retention is acceptable. It is unclear what the target for success looks like.

Nguyen et al. (2021) found that simplifying CPR algorithms—specifically by removing non-essential steps—improves adherence to guidelines and skill retention among lay persons. Their comparison of the 2010 and 2015 European Resuscitation Council guidelines indicated that

the simplified 2015 version resulted in better performance in critical CPR skills three months post-training. Farquharson et al. (2022) explored the use of text message reminders to combat low confidence, showing that spaced, brief messages increased participants' intentions to perform CPR in emergencies. Studies by Choa et al. (2009), Hsieh (2018), Nishiyama et al (2015) and Ahn et al. (2011) demonstrated that videos (showing short lectures) sent to learners' mobile phones effectively refreshed knowledge and skills, while research on feedback mechanisms (Nishiyama et al., 2017; Sato et al., 2019; Wik et al., 2002) highlighted the benefits of structured refresher training for skill retention.

Avau et al. (2019) investigated face-to-face refresher courses and found significant improvements in skill retention over time. However, the optimal frequency for refresher training remains unclear. Hsieh et al. (2018) suggested that more frequent sessions (every three months) lead to better retention, whereas Sato et al. (2019) found minimal long-term impact on CPR skills, although compression depth could be improved with frequent self-led practice. These studies emphasize the importance of simplified training protocols and innovative engagement strategies in improving CPR education and retention among laypersons.

Bottiger et al. (2015, 2016) researched the "Kids Save Lives" (KSL) programme, founded by the European Resuscitation Council (ERC) in 2015. The programme is a global initiative designed to teach schoolchildren basic life-saving skills, particularly in cardiopulmonary resuscitation (CPR). The KSL campaign recommended including CPR in the school curriculum worldwide, encouraging two hours of annual CPR training for all schoolchildren aged 12 years and above.

Lukas et al. (2016) investigated whether pupils who were trained annually for three years retained their resuscitation skills after six years, compared to those trained annually for six years. They found that both groups were equivalent in terms of knowledge and skills after six years.

FIRST AID

The first aid topics included in the 2025 Guidelines reflect both the evolving science and the shared humanitarian vision that unites first aid providers around the world. Selected through a collaborative process that integrates the best available evidence, global and local expertise and priorities identified by National Societies, these topics embody the principles of First Aid Vision 2030: universality, humanity and resilience.

The topics are organized by theme:

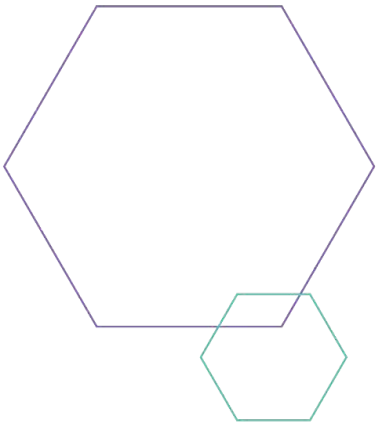
- General approach
- Unresponsiveness
- Breathing problems
- Trauma
- Medical conditions
- Environmental
- Mental distress

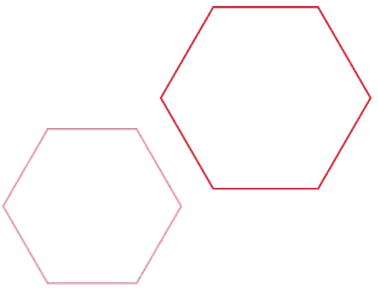
Each section translates research findings into clear, actionable guidance for those designing, teaching and delivering first aid education. The recommendations are grounded in science yet adaptable to diverse cultural and operational contexts—supporting the goal of ensuring that everyone, everywhere can be a first aider in their home, workplace or community.

First aid is more than a set of skills—it is a global act of humanity rooted in impartiality, neutrality and independence. It strengthens trust and resilience, connects communities and reflects the universality of need that defines the Red Cross and Red Crescent Movement. These Guidelines aim to support that vision by equipping every first aider—with or without medical background—with the knowledge, confidence and ethical grounding to act decisively and with care.

First aid is driven by evidence, sustained by humanity and shared by all.

GENERAL APPROACH





General approach

Key action

Provide help while maintaining personal safety and the safety and security of the ill or injured person and bystanders.

Introduction

The initial actions of individuals and groups can help or hurt an effective response. The recognition of safety and health hazards to self and others is taught in the Early recognition domain of the chain of survival behaviours. A systematic approach helps with remembering and doing the initial behaviours in a general approach. Ongoing scene hazards (e.g. fire, violence or hot environment) must be addressed by removing the hazard, removing people from the hazard or calling for help.

Once the scene is safe enough to initiate care, a systematic approach to identifying life-threatening injuries is important to prioritizing care. After life-threatening issues are treated, first aid providers can identify all other first aid ailments to either care for or to inform advanced care.

First aid scenarios require critical thinking, and a general approach helps individuals navigate this process. Although we often teach first aid in distinct modules (e.g. breathing, bleeding, CPR, poisoning), the hazards and their consequences complicate first aid actions. The general approach allows for life-threatening illnesses or injuries to be identified and managed through a primary survey of the person. The types of injuries or illnesses may overlap, and judgement may be required on what to treat first and how to do it. For the purpose of these Guidelines, life-threatening issues are:

- Unresponsiveness: When a person does not react to external stimuli (i.e. anything around them).
- Breathing problems: Difficulty or inability to breathe normally.
- Trauma: Physical harm to the body that will not maintain life (e.g. arterial bleeding).
- Medical: An acute biological response to an illness or assault to the body (e.g. Poisoning or sepsis).
- Environmental: Harm to the body from the weather conditions or surroundings.
- Mental distress: Psychological response that prevents a person from carrying out safe behaviours.

First aid requires a responder to identify these life-threatening injuries or illnesses and to prioritize care. Effective first aid education must go beyond individual skills and emphasize the importance of situational awareness, personal safety and decision-making in dynamic and often stressful conditions. In practice, many situations will be complex. In real life, they may be more complex. Providers may need to care for multiple things at once, for example, applying pressure to a serious cut to stop the bleeding while speaking with the injured person to help calm them down during a panic attack. In most situations, providers will need to care for the physical illness or injury while also applying psychological first aid skills.

Psychological first aid

Psychological first aid (PFA) is integrated with physical first aid competencies during training. Acknowledging emotions and reactions to situations in the domain of Early

recognition and addressing them simultaneously reduces stress for the individual and the first aid provider.

Research and guidance for psychological first aid is led within the Movement by the Red Cross and Red Crescent Mental Health and Psychosocial Support Hub (MHPSS Hub). The General approach section integrates considerations for psychological first aid into the chain of survival behaviours to increase awareness of psychological first aid and support first aid educators and providers in caring for the whole person.

See the psychological first aid section for background and specific skills for supporting people in distress.

Good practice points

Assess the scene

- First aid providers should be taught about the ambiguity of emergencies and that deciding to act is the most important first step.
- First aid providers should assess the scene for dangers to themselves and others before providing direct help.
- In assessing a scene that contains areas of danger, first aid providers should also observe which areas are safe (or have fewer dangers) to provide options for themselves and the ill or injured person.
- If scene safety cannot be guaranteed, then the provider needs to adjust their approach (e.g. calling for help or providing support from a distance), prioritizing their well-being first.
- Where possible, the first aid provider should take steps to protect private information. This can also help enhance the person's feeling of personal safety.

Assess the person

- First aid providers should be taught a standard approach to assessment to help them appropriately prioritize care for time-sensitive conditions and to feel more confident in their competencies.
- If possible, first aid providers should approach the ill or injured person so the person can see them. This will reduce the risk of scaring the injured or ill person or causing them to move unnecessarily. It may also help keep them at ease.
- First aid providers should assess the ill or injured person by checking for a response, normal breathing and normal blood circulation. These conditions should be treated as a priority if abnormal.
- If the ill or injured person can talk or cry, it should be assumed their airway is open and their breathing is adequate.
- An ill or injured person should be left in the position of most comfort (usually the position in which they are found) unless there is a need to move them to a different location or position for safety or well-being purposes.
- First aid providers may assess an ill or injured person further by asking them questions to determine their mental status or medical history or more closely examining part of their body (with consent). Providers should get as much information as possible about what happened by using a calm, non-intrusive manner that respects the person's needs.
- The first aid provider should communicate with the ill or injured person, explain what they are doing to help, and act with respect and empathy.

Provide care or access help

- The first aid provider should access emergency medical services (EMS) as soon as they think help is needed. If using a phone, care to the ill or injured person should be provided simultaneously by activating the phone's speaker function.
- A lack of first aid equipment should not be a barrier to providing care; first aid providers should use whatever resources are available to them.
- Immediate basic and practical needs are also priorities. Check whether the person needs water, shelter, clothing or a blanket, and try to provide them as quickly as possible. It is difficult for someone to solve problems or reach out to others when feeling cold or thirsty.
- Providers should ask if the person needs social support such as restoring family links or medical or legal assistance.
- In cases of children, connecting them with caregivers is a basic need that should be prioritized.
- Filming an emergency incident is inappropriate, particularly if it blocks the path of professional responders. First aid education should raise awareness of this fact.

Multiple casualties

- The first aid provider should protect themselves at all times from danger, aim to preserve life and reduce injury and suffering.
- If there is more than one ill or injured person, it may be appropriate to call EMS first to inform them of a potentially critical situation, and then call again once more detailed information has been gathered.
- In a multiple-casualty incident, the first aid provider should assess the ill or injured, then treat those with the most life-threatening conditions relating to breathing and circulation first.

Chain of survival behaviours

Prevent and prepare

- Know the common risks in your environment and the steps you can take to help minimize the risk of an incident occurring or worsening.
- Ensure you have access to a first aid kit or the specific equipment (a disaster kit, hi-visibility signs or clothing, etc.) according to your assessed needs and risks.
- Be aware that diffusion of responsibility (e.g. thinking someone else will help) and ambiguity (e.g. wondering if the person really needs help) are common barriers to overcome in helping an ill or injured person. Being prepared and empowered to assist people not only provides care but also empowers individuals to act and can lessen feelings of helplessness.
- Learn about the emergency services available in your context and how to access them. This may involve knowing their phone number, location or the types of questions they may ask.
- Understand the potential resistance an ill or injured person may have to certain procedures, such as the associated costs of services. Advocate for them accessing care when it is needed.
- Learn proactive means to de-escalate volatile situations.

Early recognition

Upon entering a first aid situation, be aware of the thoughts and feelings you may have that may affect the help you provide. Be alert to the fact that people read situations differently, and just because no one is responding does not mean that everything is fine (the bystander effect).

Assess the scene

A scene assessment involves identifying any potential safety risks (to you, the ill or injured person or bystanders), such as fire or exposed electrical wires. The location itself may be unsafe. If the person is in or near a body of water or ice, in a conflict area or in a closed or confined space with minimal oxygen or poisonous gas, extra care must be taken. Additionally, if there is an active shooter, contamination by a chemical, radiological or biological agent, or any other risk you cannot minimize, stay away and inform the relevant authorities (fire or police).

- If possible, seek the support of another person who can help you.
- Assess the scene for potential danger to yourself or the ill or injured person and try to identify the potential cause of the illness or injury.
- If necessary, observe areas of safety (or ones with fewer dangers) to provide a safe place for you and the ill or injured person.
- Take steps to make the scene safe. This could include accessing additional help or equipment, or changing your approach based on the danger. Do not approach the scene if it is not safe.
- Identify the number of ill or injured people.
- Remain aware of your surroundings and maintain your personal safety. This will be particularly important in conflict, disaster or multiple casualty contexts.

Assess the person

Approach carefully, calmly, and in an appropriate manner. Both the behaviour and attitude will influence how people in distress react to an offer of help. If they meet someone who is calm and focused, this will help them to feel calm and safe. The first aid provider should introduce themselves by name, and if relevant, by the name of the National Society or other organization in a caring and non-threatening or interruptive manner. Tell them what you are doing before you do it.

Identify any life-threatening emergencies requiring immediate action (e.g. the person is not breathing) and what kind of first aid can support their condition.

- Is the person responsive?
- Is the person's airway open and clear?
- Is the person breathing normally?
- Has the person got an injury that is bleeding severely?

This is often called the "ABC check" or "primary survey". If there is any concern about cross-infection, do this assessment by observing the person's chest or abdomen for signs of breathing.

Look directly at the person; do not use a phone while talking to someone; focus on what the person says. Try to be at the same physical level as the other person. For example, if the person is sitting on the ground, kneel to be at the same eye level. Practise active listening using both verbal and non-verbal communication skills.

If the person does not have any life-threatening conditions, you may be able to identify and provide support for any non-life-threatening conditions.

- Is the person showing signs of an altered mental status (confusion, aggression, etc.)?
- Does the person have any signs of injury? You may need to examine them more closely.
- Does the person have any history of an allergy or medical condition?
- How does the person say they feel?
- What other signs can you observe in them (temperature, movement, etc.)?

Immediate basic and practical needs are also priorities.

- Does the person need warmth, shelter or clothing?
- Does the person need social support (restoring family links, medical or legal assistance, etc.)?
- If the person is a child, do they need to be connected with their caregiver?

Knowing how to help people access basic needs is an important PFA skill. While the first aid provider does not need to have contact details for all the resources in the community, it is vital to know how and where to get this information when needed.

A key part of first aid is recognizing emotional reactions, accepting these without judgment, and responding in a caring, empathetic and understanding way. It is important to remain calm and be mindful of your own verbal and non-verbal communication to support the person in distress. If the person in distress has strong emotional reactions that endanger themselves or others or begin to interfere with daily functioning over a longer period of time, they should be referred for professional mental health support.

First aid steps

- Provide care for the conditions you find in the order of severity, focusing first on the person's breathing and circulation, which are critical to survival.
- Access help if necessary.
- Continue to assess and observe the person. Be alert to any changes in their condition. Take note of any vital signs if necessary.
- Provide care until professional medical care can take over or the person and their support network become self-sufficient. It may be helpful to share information about onward care options if available.

The first aid provider will need to ask questions that can help the distressed person identify what support they need. If someone does not want help, do not impose it. The questions should focus on the help needed and the priorities, not on the details of what happened. Remember, it is important to empower people to make their own decisions rather than making decisions for them, particularly at a time when they may feel very disempowered or lacking control over a difficult situation.

Handling sensitive disclosures

- Protect the person's dignity and emotional safety by gently pausing the disclosure if it becomes too personal.
- Offer to continue the conversation privately after the session.
- Set the expectation that a person does not have to share information in a group setting if it may lead to regret or vulnerability.

Techniques to calm a person in distress

To help stabilize and comfort individuals experiencing acute distress, apply the following techniques:

- Use a calm, soft tone of voice to convey safety and reassurance.
- Invite the person to share what is upsetting them and provide individual PFA if needed.
- If culturally appropriate, maintain eye contact (without staring) to show attentiveness and empathy. Offer comfort through appropriate, culturally sensitive physical gestures (e.g. a hand on the shoulder).
- Reassure the person of their safety and your intent to help, but only if the situation allows and the statement is truthful.

- Engage in grounding or distracting activities to restore a sense of normalcy, such as:
    - taking a short walk
    - moving away from distressing sights
    - offering a drink or performing a simple task together.
- Allow space for grief and use the moment to introduce positive coping strategies through group sharing.

Special situations

Managing agitated behaviours in emergencies

During emergencies, first aid providers may encounter individuals experiencing acute psychological distress or trauma. This distress may stem from pre-existing conditions, be triggered by the crisis itself, or emerge as a reaction to overwhelming circumstances. In some cases, individuals may become emotionally agitated, or even pose a risk to themselves or others.

Understanding distress reactions

Distress reactions can appear in various ways, including:

- disorientation or confusion
- heightened anxiety or panic
- verbal aggression or shouting
- physical agitation or restlessness
- withdrawal or unresponsiveness

Principle of safety

In rare but serious cases, these reactions may escalate into violent or self-harming behaviour. Such behaviours may be driven by fear, trauma or a perceived loss of control. The safety of the first aid provider, the affected individual and bystanders is most important. Before engaging with an agitated person:

- Assess the environment for safety risks.
- Do not intervene if the situation poses a threat to your own safety.
- Maintain a safe distance and avoid physical contact unless absolutely necessary.
- Seek assistance from security personnel, law enforcement or trained professionals if the individual becomes violent or unmanageable.

If safe to do so, apply calming techniques such as:

- speaking slowly in a calm, non-threatening tone
- avoiding sudden movements or loud noises
- offering reassurance without confrontation
- redirecting attention to neutral or grounding activities.

Referral and follow-up

If the individual's behaviour indicates a need for specialized care—such as persistent confusion, inability to function, threats of harm, or substance misuse—refer them to appropriate mental health and psychosocial services. Ensure follow-up where possible to confirm they have received the necessary support.

Medication administration

Generally, a first aid provider is not authorized to prescribe or give medication. In some countries, these legal restrictions are evolving. Depending on the scope of practice, the target audience, medical oversight, as well as the extent and depth of the educational programme offered, medication administration may be appropriate and used in particular first aid situations.

- In situations where a person has prescribed medication (such as an inhaler or auto-injector), first aid providers may assist the person, if local regulations allow.
- First aid providers should learn about the common conditions they may encounter and the types of medication that may be used by an ill person.
- First aid providers should become familiar with the various methods of administration (e.g. how to use the auto-injector or inhaler).
- First aid providers should try to contact EMS before administering medication if possible.
- First aid providers should inform EMS of any medication the person has taken or been administered, especially if the person is unable to communicate this information themself.
- First aid providers should advise or assist the ill person to take their medication in accordance with the prescribed dose and administration route.

First aid providers may typically administer or assist with medication for the following conditions:

- heart attack (aspirin, nitroglycerin)
- asthma attack (inhaler)
- allergic reaction (antihistamine)
- anaphylactic reaction (epinephrine)
- decompression sickness and hypoxia (oxygen)
- opioid overdose (naloxone)
- fever (antipyretic)
- earache, headache, sore throat, period pain, Back pain (painkiller)
- diabetic emergency (insulin, glucose).

Multiple casualty incident

In a multi-casualty event, large numbers of people are affected simultaneously. The scene is often chaotic, with survivors, families of victims and bystanders all experiencing varying levels of psychological distress. When responding to a multiple casualty incident, call EMS first to inform them about a potentially critical situation, and then call them again when you have detailed information to give them.

Quickly assess all the ill or injured before providing care, and provide care first to those with the most life-threatening conditions relating to breathing and circulation.

Who is affected and how they may react

1. Survivors
    - May be in shock, confusion, disorientation, or panic.
    - Some may be numb or silent, while others may cry, scream or express guilt for surviving.
    - Physical injuries may compound emotional distress.
2. Family members
    - Often arrive at the scene or hospitals in a state of desperation and fear.
    - May express anger, helplessness or overwhelming grief, especially if loved ones are missing or deceased.
    - Some may demand information or become agitated due to lack of updates.
3. Bystanders and witnesses
    - Even if not directly harmed, they may experience trauma due to the exposure.
    - Reactions include anxiety, nausea, trembling or feeling frozen.
    - Children and elderly bystanders may be especially vulnerable.

First aid providers are often the first point of human contact in these situations. While attending

to physical injuries, they can also provide basic emotional support using PFA principles.

Access help

- Identify what type of help is needed to address immediate needs and problems and support the person's ability to cope with the situation. It may be more than one type of help. For example, the person may need rescue service, PFA and medical care.
- Access the next level of care as soon as the need is expected. This will get help to you quicker, and if you are phoning, the call-taker may be able to guide and support your first aid actions.
- Identify additional resources that could help you in accessing help or providing care, such as bystanders or transport options.
- If life-saving first aid is being provided, access care in the most efficient way possible. This may mean making a call using the speakerphone function or arranging transport that allows care to be continued during the journey.
- Help the person prioritize their needs and find helpful solutions to the issues. The first aid provider may have to accompany the person in taking the first steps and continue to empower them to act. PFA aims to enable people to make their own informed decisions.
- In some cases, it might be better to access EMS quickly with incomplete information. For example, accessing EMS early for a full bus crash, even without knowing the exact number of injured, will start the process of getting help. In other contexts, more detailed information may be needed. For example, a message sent from a remote setting should have detailed information so EMS can send adequate resources to help.
- If calling EMS, remain calm and answer their questions as clearly and accurately as you can. This will help them prioritize your call.

Recovery

In the case of minor illnesses or injuries, the role of the first aid provider is one of support and empowerment to allow people to cope with the difficulties and be responsible for themselves.

Accurate information about the event, the rescue, as well as information about loved ones or others who are impacted, their safety, rights and how to access the services and things needed are essential for anyone in a crisis. Provide accurate and useful information relevant to the individual. This could range from practical information on what happened, where to access different resources, or what is possible and important to do at the moment, to psycho-education that helps normalize the reaction of distress and prepare the person for possible reactions that may follow in the coming days and weeks. Information helps people feel empowered to make informed decisions about their situation.

It is a priority to connect a distressed person with their family or friends, either in person or by phone, to update them on what is happening and check if the loved ones are fine. The first aid provider should also know the services to help link people to their family in emergencies. Ask about who should be informed and called upon in the social network.

Examples of helpful practical support are:

- contacting someone who can stay with the ill, injured, or distressed person
- arranging for the pick-up of children, or the provision of food, shelter, clothing and reassurance to children
- helping the person with transport to a safe place
- helping the person to access a hospital or other support services.

Encouraging the use of helpful coping strategies and avoiding unhelpful ones is also essential.

Examples of unhelpful coping strategies include using alcohol or substances to try to forget the problems, denial or isolating oneself. While these strategies may feel like they are helping the person cope in the moment, if continued over long periods, they are likely to impact the person negatively and cause more challenges. Having information on natural and normal reactions to a crisis event can also help the person use healthy coping strategies.

Referrals

Referral means linking a person in distress with the appropriate care provided by other people, agency or facility, either by contacting the other service directly or giving contact details to the affected person. When a first aid provider assesses that the person needs help beyond that which they can provide, they make a referral. It is good practice to follow up with the person afterwards to ensure that they have received the support needed.

Refer specialized psychological help if someone:

- has not been able to sleep for the last week and appears confused and disoriented
- is so distressed that they are unable to function normally and care for themselves or their children
- loses control over their behaviour and behaves unpredictably or destructively
- threatens to harm themselves or others
- uses substances or alcohol excessively.

Self-care for the first aid provider

In order to provide help responsibly, first aid providers must take care of their own health and well-being. Providers can be affected by supporting others in crises or by their own distress. Providing first aid can be difficult both physically and emotionally. It is not easy interacting with people who are in distress and this could lead to feelings of guilt, sadness and frustration if first aid providers feel they have not done enough. These may also result in cumulative stress and burnout. It is also important to acknowledge that different situations may affect or resonate with first aid providers who are unique individuals, shaped by their own experiences. There is no shame in finding things difficult and it is essential to practise proper self-care in the first aid providers' own lives.

First aid providers can apply the PFA principles of Look, Listen and Link, and learn to recognize their own risk factors to well-being, their own limitations and what kinds of situations may be overwhelming. They can also discover what protective factors such as support systems and healthy stress coping strategies they have in place.. Building awareness of their own strengths and weaknesses as a first aid provider and knowing when to call for help from others can act as preventive measures.

It is imperative that all first aid providers and volunteers are given supervision and continuous support while providing care and assistance for others during times of crisis to ensure they are not overwhelmed by the circumstances and can maintain their own psychological well-being. It is recommended that all National Society staff and volunteers providing emotional support within the principles of PFA have access to a support system where they can receive the assistance they need. The support system team should take time to come together before, during and after providing emotional support.

Education considerations

First aid education can increase the likelihood that a person will get the help they need in a first aid emergency. Education can increase a learner's intention to help by supporting them to develop confidence and willingness to act. Weaving helping behaviour messages and activities

throughout the content of an educational intervention can increase a learner's intention to help by supporting them to develop confidence and willingness to act.

Context considerations

- Assessing the scene for danger will vary considerably across contexts. Discuss with learners the types of incidents they are likely to encounter (road traffic collisions, accidents at work or in the home, conflict, etc.).
- The role of the first aid provider will also be affected by who else is likely to be on the scene at the time, and this might facilitate or inhibit intervention (Levine et al., 2020). For example, their response might be different if they are alone, if they are with a colleague who can help them or if they can enlist the help of bystanders.
- The role of the first aid provider might also be affected by the behaviour of other people, and the relationship of the rescuer to those other people. In some contexts (usually ambiguous, non-violent ones), the bystander effect can occur where no one responds to an ill or injured person because no one else is doing anything to help (Van de Velde et al., 2009; Levine & Manning, 2013). In other contexts (usually unambiguous, violent ones) there may be a "reverse bystander effect" with bystanders coming together to respond (Fischer et al., 2011, referenced by Levine et al., 2020).
- The type of help available will vary based on local factors. Programme designers should ensure their programmes reflect local circumstances. Be aware that help might not be available for all locations or contexts. Learners should be aware of what is available. For example, an urban area may have easy access using an emergency phone number. However, a remote area in the same country may not have access using the same phone number. This may be even more complicated if people travel between the two contexts.
- Be aware of myths and realities that may exist in local areas that may influence efficient access to care. For example, local taxis might provide faster transport than ambulances, or this could be a perception which hinders efficient access to care (Jayaraman et al., 2009; Mould-Millman et al., 2015).
- If there are any barriers to accessing care in a particular context, programme designers should ensure that those barriers are addressed in learning activities (Watts et al., 2011). For example, an emergency phone number may offer language translation or text services, allowing those who do not communicate in the dominant language to still seek help.
- Raise awareness that some first aid situations may be solved by helping the person connect with their usual care providers.
- Prepare learners for the type of incidents they are most likely to encounter. For example, in areas where there are frequent traffic collisions, learning should reference these and identify the level and availability of emergency services and others who can help.
- In preparing people for events such as terror attacks, include individual safety measures and local regulations in the first aid education.

Learner considerations

- Encourage learners with sensory or physical disabilities to consider how they can complete the assessments of the scene and the person in a way that works with their strengths. Also, work with them to devise strategies that they can use to safely move a person without injuring themselves in the process.
- Work with learners to develop strategies to overcome fear when faced with an emergency. Use educational approaches which encourage confidence and willingness to act according to learner needs and preferences.
- Seek to understand learners' intentions to act and their motivations or barriers to doing so to make your educational approach effective (Miller & Pellegrino, 2017; Heard et al., 2019).

Facilitation tips

Participants will naturally feel more comfortable identifying and caring for physical injuries as they are perceived as more concrete. In each situation, reinforce that there is likely more to do than simply addressing the physical concerns. First aid providers should also be prepared to support the psychological needs of ill or injured persons.

Assess the scene

- First aid providers find it most difficult to decide to act. Learners should be taught about ambiguity and how deciding to act is the most important first step (Vaillancourt et al., 2008).
- Guide learners to reflect on their own experiences with helping in the past. The theme of ambiguity and the bystander effect may come up in stories shared by learners (or the facilitator). Bringing up these themes as lived experiences will help learners who have not experienced these feelings to relate to these concepts.
- Since there are a large number of potential safety hazards, focus on the principle of scene assessment: identify and manage dangers. Allow learners to identify potential dangers within their contexts, as well as solutions that they would consider.
- Focus on how learners can eliminate, control or work around potential dangers. Avoid focusing on what learners should not do when faced with danger as this may discourage any action instead of encouraging safe action.
- Supplement discussion of potential dangers with specific instruction for any risks where the probability of the risk is high or where there is misinformation present. Consider the work and guidance of other programmes (both inside and outside the Red Cross Red Crescent) to ensure synergy.
- Depending on the situation, the first aid provider may need to decide whether to move the ill or injured person. The first aid provider should only move the person if they are in danger, need to travel to medical care, or if the person is in a position that makes it difficult to assess and provide care. First aid providers will need to balance the risk that may be caused by moving the ill or injured person, versus the risk of not moving them.

Assess the person

- An organized framework to guide assessing the ill or injured person, (e.g. ABC) may help learners to be thorough and prioritize the care that may be required.
- Emphasize that the environment may evolve, both quickly and slowly. For example, tensions may suddenly escalate, or weather patterns may begin to shift over time. As well, some characteristics of the ill or injured person may not be immediately known, especially if they live with a disability. As a result, first aid providers should continue to remain attentive to their environment and the ill or injured person, changing their approach with the situation.
- Even though a first aid provider may not be able to access an ill or injured person in an unsafe environment, first aid providers should consider creative solutions. For example, the first aid provider may be able to verbally coach the ill or injured person in assessing and caring for themselves from a distance.

Access help

- All first aid education should include identifying the types of help and resources they can draw on and how to access them, as well as helping learners to determine whether to first access help or provide care, depending on the situation.
- Emphasize to learners in contexts with an active EMS phone system in place that they can access help as soon as they suspect they need it. This may help give them confidence

in their actions.
- Help learners understand the community resources they can draw on for help. This could include neighbours or bystanders, or the environment (shelter, water, etc.). Bystanders, for example, can be asked to control a crowd, to protect the dignity of the ill or injured by forming a barrier, to create shade over or block cold wind or rain with a tarp (sheet), go to the nearest phone to call for help or to get equipment such as a defibrillator.

Multiple casualty incident

- Simulations are an educational tool that may be used to develop critical thinking skills, awareness and preparedness for a multiple casualty incident among first aid providers and healthcare professionals.
- Highlight to learners that a multiple casualty incident is an event that results in multiple injured people, outnumbering and overwhelming emergency medical services. This situation includes road traffic collisions, terror attacks, multiple shootings and disasters.
- If possible, include professional responders, healthcare workers, Red Cross Red Crescent volunteers, civil organizations and other appropriate groups in the exercise. Doing so will help people to understand each other's function and role before an actual event.
- Run simulations on-site or using virtual reality.
- Empower learners by removing any barriers to action and have them practise using the equipment they might have close at hand (e.g. clothing to control bleeding).
- Explain the process of triage and prepare learners to manage onlookers.
- Help learners identify who may need immediate emotional support (e.g. those in visible shock, crying uncontrollably or searching for loved ones).
- Simulate chaotic environments to practise offering calm, clear communication and basic comfort measures.
- Emphasize the importance of working with other responders and knowing referral pathways for mental health or protection services.
- Discuss how survivors, families and bystanders may all show distress differently and require different types of support.

Facilitation tools

- Use role play to practise developing confidence in assessing the scene, moving people and asking others to help. Role play can also be useful for practising the process of calling for help, including the types of questions they may be asked.
- A memory tool may help learners remember the important things to do when assessing a person. ABC is a common tool used.
- Encourage learners to programme emergency access phone numbers into their phones, particularly if they do not have an easy-to-remember phone number, or if travelling to a new area with different phone numbers.
- Create or find spaces which are awkward and ask learners to practise helping people in different positions. For example, set up a scenario where a person has collapsed in a small toilet cubicle or on the stairs.

Learning connections

- See the topics on disaster and conflict for situations where there could be many injured people.
- The movement of someone with a suspected spinal injury should be minimized.
- If a person is unresponsive, open their airway and check for breathing.
- It is often helpful to highlight to learners that the mechanism (cause) of injury may be a risk for their safety.
- Bleeding control is a key skill in a multiple casualty context.

Scientific foundation

Non-systematic review

Helping behaviour and the bystander effect

There is a large body of literature on helping behaviour and the bystander effect. We have selectively drawn evidence from literature specific to first aid interventions.

Systematic reviews on this topic are provided by Vaillaincourt et al. (2008) and Van de Velde (2009). Vaillaincourt examines bystander CPR rates and concludes that a lack of interest and motivation to learn CPR skills contributes to the reluctance to intervene and provide CPR in real situations. They also identify barriers, such as situational ambiguity, as important in influencing a bystander's decision to intervene. Van de Velde concludes that first aid programmes that train participants to overcome inhibitors of emergency helping behaviour could lead to better help and higher helping rates.

Training in first aid is also linked to increased confidence to help in an emergency, as documented by Heard et al. (2020) in a scoping review. The review considers public confidence in first aid skills, willingness to help during an emergency and barriers to or enablers of learning and delivering first aid in an emergency. The findings identify high levels of perceived knowledge, confidence and willingness to help, supporting the idea that the public can play a vital role during an emergency. However, the findings also point to low uptake levels and barriers to learning first aid and helping, indicating that the first aid education landscape needs improvement.

Another review of the literature is provided by Levine et al. (2020), which draws on prior literature on the bystander effect and argues that more recent evidence shows that this phenomenon does not apply to violent or dangerous emergencies. They cite meta-analyses and recent research on closed-circuit television (CCTV) footage, which show that bystander intervention is, in fact, the norm. They also draw on studies of social identity (such as Levine and Manning (2013)), which support theories that individuals are most likely to help people they know (family members, friends and colleagues). Nonetheless, in violent and dangerous situations, the willingness of people to intervene could be due to the emergence of a “group membership” that forms amongst strangers who are all present at the same event.

There is a lack of evidence to support any one particular approach to developing “helping behaviour” through first aid education. Different situations, cultures and legislatures influence behaviour and attitudes toward helping, and, where studies exist, they are incomparable in terms of outcome measures and variables. We identify this gap while also acknowledging a growing body of evidence on education that explores the development of learners' confidence and willingness to act, such as Miller and Pellegrino (2017).

Role of first aid providers

As the first people on the scene, first aid providers can play a vital role in caring for the injured before professional help arrives. Properly preparing providers is critical to ensuring their skills and efficacy (van Romburgh & Mars, 2019). Awareness of this role is critical in all first aid situations and supporting learners to act as well as to call for help is identified by Oliver et al. (2017a, 2017b).

Confidence to act without proper equipment

Providers need to understand that a lack of equipment does not mean they are unable to help. Providing CPR or controlling bleeding with clothing (or the person’s hand) are examples of

life-saving actions without any equipment (Jacobs et al., 2016; van Romburgh & Mars, 2019).

Bystander filming

Management of the accident scene has traditionally focused on preventing further danger. However, cultural developments create new challenges for responders (Bazeli et al., 2017). One such challenge is that some bystanders now film the incident, not only humiliating the injured person but also actively blocking the path of professional responders. It is important to emphasize the danger of this action to learners.

Implications of bystander first aid

Jacobs et al., (2016) noted the need to acknowledge bystanders as those able to respond immediately to ill or injured people. Bystanders (first aid providers) should be included in a reorganized response structure and be empowered through the recognition of their role in responding to emergencies. Conversely, another paper warns of the potential damage bystanders can do, such as pulling people out of cars at road traffic incidents (Bazeli et al., 2017). Both studies identified that education is critical to increasing survival rates following multiple casualty events.

Turner et al. (2016) identified that haemorrhage is the leading preventable cause of death in trauma. They also stated that equipment to control bleeding, as well as public education on how to do so, should be made widely available. In a separate opinion paper on improvised first aid techniques for terror attacks, Loftus et al. (2018) suggested empowering providers to get creative and use everyday items to make first aid equipment that can save lives.

Importance of agency coordination

Bazeli et al. (2017) conducted a qualitative study in Iran using semi-structured interviews to gain insights from different participant groups on the management of multiple casualty traffic incidents. Reports stated there was poor coordination between agencies, duplicated efforts by different organizations and no centralised or integrated command system.

After a multiple casualty training and mock event trial in Sierra Leone, Leow et al. (2012) concluded that when high-resource logistics are applied to environments with limited resources, the result is insufficient systems for transport, tracking and adequate resourcing. Participants identified inter-agency coordination as the most valuable lesson learned.

Turner et al. (2016) conducted a systematic review that identified a need for inter-agency leadership and coordination to be developed in advance, as poor communication was a consistent feature when responding to multiple casualty civilian shooting incidents.

Simulation training

Simulations are an opportunity to create a life-like environment where facilitators can teach providing first aid in a multiple casualty incident.

- Wilkerson et al. (2008) showed that immersive training through a virtual reality simulation is a powerful educational tool. The simulation helped first responders to identify how a chaotic, stressful environment challenges the knowledge and skills learned in the classroom.
- Cicero et al. (2018) had positive results when they tested a video game to explore whether it would improve triage accuracy within the game.
- Yanagawa et al. (2017) explored a simulation used in a multiple casualty life support course. The results showed that the intervention group (who completed the simulation) performed first aid significantly better than the control group.

These three studies were conducted with healthcare professionals or trained rescuers and should be adapted before implementation with first aid providers. However, they demonstrate the value of simulations for multiple casualty education, and we encourage further exploration of adapting this tool for general first aid providers.

Outside of healthcare and trained rescue professionals, a different paper concluded that regular and specific preparedness exercises are essential. These activities should take place at schools and other public areas and involve both the local public and private authorities (Turner et al., 2016).

Triage by first aid providers

The study by Leow et al. (2012) in Sierra Leone included Red Cross personnel who correctly triaged people in the simulation exercise.

Badiali et al. (2017) conducted a case-control study and assessed 400 basic life support participants' use of a rapid assessment tool when responding to multiple casualty incidents. The participants were non-medical ambulance crews, with 200 in each group (intervention and control). The intervention group completed a brief START training with the tool 30 minutes before the exercise, while the control group did not. The intervention group correctly triaged 94.2% of the cases; the control group did so in 59.8% of cases. However, this study was theory-based rather than practical, meaning that triage may look very different in a real-life situation.

Psychological first aid

Psychological first aid (PFA) is integrated with physical first aid competencies during training. Acknowledging the emotions and reactions to situations during the domain of early recognition and addressing them simultaneously reduces the stress on the individual and first aid provider.

Several models of PFA have been developed, each with slightly different elements but all following similar principles to ensure safety, promote calmness, connectedness, hope and a sense of efficacy. By integrating various aspects of the different approaches, the World Health Organization (WHO) developed the three action principles of Look, Listen and Link. It is an approach particularly well-suited for the International Federation of Red Cross and Red Crescent Societies, as it is connected to the fundamental principle of humanity and the intention to help prevent and alleviate human suffering.

PFA can be delivered by any individual who has received appropriate training, including volunteers, first aid responders and members of the general public. PFA does not require professional mental health qualifications. Training equips individuals with the skills to offer supportive, non-intrusive assistance to people experiencing distress.

PFA is applicable in situations where individuals are experiencing acute psychological distress due to crises or emergencies. While many people demonstrate resilience and adapt well, those showing signs of distress may benefit from PFA. It is most effective:

- during or immediately after a stressful event
- in the days, weeks, or months following an incident
- even years later, when people recall the distressing events.

Stress reactions may be immediate or delayed, and prolonged crises can result in cumulative emotional strain.

PFA can be administered in any safe and appropriate environment that ensures comfort and privacy for both the provider and the affected individual. Suitable locations include:

- homes, schools, clinics, hospitals
- community centres, evacuation shelters
- public spaces such as airports, train stations or even outdoors

In cases involving sensitive experiences (e.g. sexual violence and abuses), privacy and confidentiality are essential to uphold dignity and safety.

What do PFA providers do?

PFA is a non-intrusive, practical support approach. It is not counselling or psychotherapy. A person does not have to be a mental health professional to provide PFA; it can be provided by anyone trained to do so.

PFA providers will:

- Provide comfort and reassurance to individuals in distress, helping them feel safe, calm and supported.
- Assess immediate needs and concerns to determine appropriate support and referrals.
- Protect individuals from further harm, including physical, emotional and psychological risks.
- Offer emotional support through active listening, empathy and presence.
- Address urgent basic needs, such as access to food, water, shelter and warmth.
- Facilitate access to information, essential services and social support networks to promote

recovery and resilience.
- Respect individuals' privacy, readiness, personal coping style and timing.

Providers should not ask individuals to recount traumatic events in detail, analyse or interpret their experiences, or disclose personal details or feelings against their wishes. If they want to share, however, we listen non-judgementally and let the person proceed at their own pace. The focus should be on meeting present needs.

Look, Listen, Link

It is important to understand that, in reality, first aid providers may move through these actions in different ways and sequences. PFA principles are considered a cycle which can be initiated at any point and may involve repeating or cycling through "Look", "Listen","Link" multiple times during the process.

Look	Listen	Link
• Information on what has happened and is happening • Who needs help? • Safety and security risks • Physical injuries • Immediate basic and practical needs • Emotional reactions	• Approach someone • Introduce oneself • Pay attention and listen actively • Accept others' feelings • Calm the person in distress • Ask about needs and concerns • Help the person(s) in distress find solutions to their immediate needs and problems	• Access information • Connect with loved ones and social support • Tackle practical problems • Access services and other help

The **LOOK** principle in PFA involves systematically observing the environment and individuals to identify immediate needs, risks and safety concerns.

- Situational awareness
  - Gather factual information about what has occurred and the current context.
  - Use a calm, respectful and non-intrusive approach to understand the scope of the crisis.
  - Assess whether additional support or emergency services are required.
- Identifying who needs help
  - Prioritize individuals based on visible distress, vulnerability and urgency of need.
  - Recognize stress reactions and be attentive to marginalized or at-risk groups.
  - Approach individuals safely and respectfully.
- Safety and security
  - Evaluate the environment for potential threats or hazards.
  - Ensure the safety of both the provider and affected individuals before proceeding.
  - Maintain confidentiality to support a sense of personal security.
  - If safety cannot be guaranteed, do not initiate PFA.
- Physical health status
  - Check for signs of injury or illness.
  - Administer basic first aid if necessary and refer to medical services as appropriate.
- Immediate basic needs
  - Identify and respond to urgent needs such as water, shelter, clothing or warmth.
  - Facilitate access to social support, family reunification, medical care or legal assistance.
  - For children, ensure connection with caregivers is prioritized.

- Emotional reactions
    - Observe and acknowledge emotional responses without judgement.
    - Respond with empathy, calmness and supportive communication.
    - Monitor for severe or prolonged reactions that may require referral to mental health professionals.

The **LISTEN** principle focuses on engaging with affected individuals through respectful communication, empathetic presence and understanding their concerns and needs.

- Approach with care
    - Initiate contact calmly and respectfully.
    - Introduce yourself and your affiliation (if relevant) in a non-threatening manner.
    - Your demeanour influences how safe and supported the person feels.
- Practise active listening
    - Maintain eye contact (if culturally appropriate) and avoid distractions (e.g. mobile phones).
    - Position yourself at the same physical level to foster connection.
    - Use verbal and non-verbal cues to show attentiveness and empathy.
- Validate emotional responses
    - Accept all emotional reactions without judgement.
    - Respond with compassion, even if behaviour appears challenging.
    - Recognize that distress may manifest in different ways and may change over time.
- Support emotional regulation
    - Be a steady, empathetic presence.
    - Allow individuals to express emotions freely when it is safe.
    - If needed, redirect focus to less distressing topics to help stabilize emotions.
- Explore needs and concerns
    - Ask open, respectful questions to identify immediate needs.
    - Do not force help or probe for details about the event.
    - Empower individuals to make their own decisions and regain a sense of control.
- Facilitate problem-solving
    - Help prioritize and address immediate needs.
    - Encourage self-efficacy and informed decision-making.
    - Support the use of healthy coping strategies and discourage harmful ones (e.g. substance use, isolation).
    - Provide information on normal stress reactions to promote resilience.

The **LINK** principle focuses on helping individuals access relevant information, services and social support systems to promote recovery and self-reliance.

- Provide accurate and relevant information
    - Share clear, factual updates about the event, rescue efforts and available services.
    - Offer psychoeducational information to normalize stress reactions and prepare individuals for possible emotional responses in the coming days or weeks.
    - Empower individuals to make informed decisions by reducing uncertainty and confusion.
- Facilitate connection to loved ones and social networks
    - Assist individuals in contacting family or friends to provide updates and emotional support.
    - Identify key people in their social network who should be informed or involved.
    - In emergencies, link individuals to family tracing or reunification services.
- Address practical needs
    - Support with immediate logistical challenges, such as:

        - arranging companionship or supervision
        - coordinating child pick-up or care
        - providing access to food, shelter, clothing or transport
        - facilitating access to medical or legal services
- Enable access to services and support systems
    - Guide individuals to appropriate health, protection or community services.
    - Accompany or remain with the person until further assistance is available, if needed.
    - Reinforce autonomy by encouraging individuals to take active steps toward recovery.

Referrals

Referral in PFA involves linking individuals in distress to appropriate services, professionals or facilities when their needs exceed the scope of PFA. This may include directly contacting the service or providing the individual with accurate contact information. Follow-up is recommended to ensure the person has accessed the necessary support. Refer individuals to mental health professionals if they exhibit any of the following:

- Persistent sleep disturbance (e.g. unable to sleep for a week) accompanied by confusion or disorientation.
- Severe distress that impairs daily functioning or the ability to care for themselves or dependents.
- Loss of behavioural control, including unpredictable or destructive actions.
- Threats of self-harm or harm to others.
- Excessive use of alcohol or drugs as a coping mechanism.
- Children or elderly in vulnerable situations that need protection and social support.

Psychological first aid for children

Children may face significant challenges during crises, including illness, loss, separation, exploitation or abuse. While the core principles of PFA for children mirror those for adults, children require additional support given their developmental stage and dependence on caregivers.

PFA for children is based on the same principles as for adults. However, children may require more support than adults because they depend on others for protection and care. Children do not have the same experience or physical and emotional maturity as an adult and therefore may respond differently from an older person. Children's reactions are influenced by how they experience the distressing event first hand. They are also influenced by how their caregivers and others around them react to the situation, and by changes in their daily life and interactions with others. Children react according to what they understand about the crisis event, which in turn is related to their stage of development, abilities and previous experiences.

Here are some key differences between helping adults and children, or additional actions needed:

- Look
    - Determine whether the child is alone or accompanied by others.
    - Assess protection needs such as risks of exploitation or abuse.
- Listen
    - Use language appropriate for the child's age and emotional and social development (e.g. use of simpler words for younger children).
    - Ask about needs and concerns with age-appropriate questions.
- Link

- Assess the child's needs with the child and caregiver, whenever possible.
- Help the child access protection and services for basic needs.
- Give age-appropriate information.
- Help parents and caregivers support their children.
- Help children to distance themselves from the stressors or danger by providing space for play or referring them to a child-friendly space together with their caregivers.

Self-care for the first aid provider

First aid providers can be affected by supporting others in crises or by their own distress. To help responsibly, providers must take care of their own health and well-being to avoid cumulative stress and burnout. First aid providers can:

- acknowledge their unique situation and experience
- practise self-care for themselves
- apply the 'Look', 'Listen', and 'Link' principles to themselves to recognize their own risk factors, limitations and the kinds of situations that may be overwhelming.
- identify and put in place the protective factors that will help them, such as support systems and healthy coping strategies
- build awareness of their strengths and weaknesses so they know when to reach out for help.

It is also important that support systems be put in place to supervise and provide continuous support to all first aid providers and volunteers who provide care and assistance to others during times of crisis.

Education considerations

When teaching PFA in the context of first aid, it is important to emphasize practical, scenario-based learning that reflects the realities of high-stress, time-urgent or even multi-casualty environments. Educators should ensure that learners understand how to balance physical and emotional care, recognizing signs of distress in survivors, families and bystanders while managing their own stress responses. Training should include role-playing exercises, cultural sensitivity and communication skills that prioritize empathy, active listening and non-judgemental support. Additionally, learners should be equipped with knowledge of referral pathways and how to provide comfort without overstepping professional boundaries. Integrating PFA into first aid education helps responders offer holistic care that addresses both visible injuries and invisible emotional wounds.

Context considerations

- When teaching or applying PFA skills, it is important to consider the context of the crisis, cultural norms and available support systems.
- In some countries, there may be confusion about the terminology used to refer to the principles and helping skills in PFA, such as Mental Health First Aid (MHFA), psychosocial first aid and others. While both PFA and MHFA aim to support people in distress, they differ in context and focus. PFA is used in acute crises to reduce immediate distress and promote stabilization, while MHFA is used in non-emergency settings to recognize and respond to signs of mental health conditions. However, both share core principles such as empathy, active listening, non-judgement and linking to support. It is important to note that definitions and practices may vary across countries, depending on national guidelines and training models.
- First aid responders may also experience post-traumatic stress injury (PTSI). It is a non-clinical term that encompasses a range of mental health injuries, including some

operational stress injuries (OSI), anxiety and depression. It characterizes symptoms as injuries caused to first aid providers as a direct result of their work or exposure to traumatic situations.
- PFA in first aid is often applied in high-pressure, unpredictable environments such as disasters, accidents or violent incidents. Training should reflect these realities through scenario-based learning, helping learners practise staying calm, prioritizing safety and offering support amidst chaos.
- First aid providers are not mental health professionals. Training should emphasize that PFA is about basic emotional support, not diagnosing or treating mental health conditions. Learners should understand when to provide comfort and when to refer someone for specialized care.
- In low-resource or emergency settings, access to mental health services may be limited. PFA training should include adaptable strategies for offering support when referral pathways are unclear or unavailable, and for making the most of community-based resources.
- Materials and instruction should be adapted to the learners' language, literacy level and communication styles. Avoid clinical or technical terms and use simple, clear language that resonates with local experiences.

Learner considerations

- Learners should be encouraged to reflect on how cultural beliefs and norms influence emotional expression, help-seeking behaviour and perceptions of distress. Training should help them adapt PFA approaches to be respectful and appropriate in diverse cultural settings.
- Learners need to grasp how PFA is applied in acute, high-stress environments—such as disasters, accidents or violent events—where emotional reactions can be intense and varied. Training should include realistic scenarios to build confidence in responding under pressure.
- Learners must understand that their role is to provide basic emotional support, not to diagnose or treat mental health conditions. Emphasizing boundaries and referral pathways is key to preventing role confusion and ensuring ethical practice.
- In many settings, learners may face limited access to mental health services. Training should equip them with practical, low-resource strategies for offering support and making the most of community-based or informal support systems.
- Learners should be trained to use clear, compassionate and non-technical language when offering support. This includes avoiding clinical terms and using locally understood expressions of care and empathy.
- Some learners may have personal experiences with trauma. Facilitators should create a safe learning environment, normalize emotional reactions during training and include self-care strategies as part of the curriculum.

Facilitation tips

Teaching PFA concepts and principles

- Use examples from local emergencies or disasters to show why PFA matters in first aid.
- Incorporate role plays, case studies and group discussions to help learners internalize principles like safety, calm and connectedness.
- Reinforce that PFA is not counseling or therapy—it is about offering humane, supportive presence and linking to further help.

Promoting self-care for first aid providers

- Let learners know that feeling overwhelmed or emotional after a response is common and valid.

- Teach grounding, breathing exercises, peer check-ins, reflective journalling and other self-care activities.
- Promote a culture of mutual care among responders: “Check on your teammate as you check on survivors.”
- As a facilitator, share your own strategies and encourage learners to plan for rest, nutrition and emotional decompression after responses.

Facilitation tools

- A memory tool may be used to help learners remember key points about PFA. In PFA, the Look, Listen and Link or “3Ls” are common terms used.
- Show real-life or simulated PFA scenarios to spark discussion and analysis.
- Use written or video-based cases to analyse how PFA can be applied in different contexts.
- Use role play to practise developing confidence in assessing the scene, moving people and asking others to help. Role play can also be useful for practising the process of calling for help, including the types of questions they may be asked.
- Give learners different roles (e.g. survivor, bystander, first aid provider) to explore diverse perspectives and reactions.
- Facilitate peer learning and emotional processing after simulations or role plays.
- Encourage learners to write about their own reactions, insights and self-care strategies.
- Use quick knowledge checks (digital or paper-based) to reinforce key concepts.
- Provide learners with simple, portable tools they can use in real emergencies.
- Help learners understand how to connect people to further support in their local context.
- Guide learners in creating their own self-care plans for use after deployments or stressful responses

Learning connections

See the topics on acute grief, anxiety and panic, suicidal ideation and traumatic event.

Hand hygiene

Key action

Use soap and water to wash your hands.

Introduction

Good hand hygiene is a crucial measure to prevent the spread of germs, which can cause people to get sick. The Global Handwashing Partnership estimates that inadequate hand hygiene results in nearly 300,000 deaths each year, with most deaths being among children younger than five years old (Tharaldson & Moore, 2018). First aid providers must practise good hand hygiene to prevent the spread of germs and reduce the likelihood of getting or spreading infections. During a pandemic, more frequent handwashing is recommended.

Guidelines

- Handwashing should be done with soap and water.**
- Hand hygiene can be achieved using an alcohol-based hand gel with at least 70% volume of ethanol or 60% of another alcohol for maximum efficacy.*
- Hand hygiene education and access to soap and water may improve hand hygiene compliance in healthcare workers and within the community, including schools.*

Good practice points

- First aid providers should wash their hands before and after providing first aid care to an ill or injured person. If there is not an opportunity to wash hands in an emergency, do not delay providing first aid.
- Hands should also be washed at the critical times listed below, at minimum:
    - after using the toilet or changing a diaper
    - before, during and after food preparation
    - before eating
    - after blowing or wiping the nose
    - after coughing or sneezing
    - after touching an animal, animal food or animal waste
    - when hands are visibly soiled.
- Access to clean running water and soap is ideal. Any kind of soap should suffice.
- Handwashing should be continuous for at least 20 seconds, covering all parts of the hands, fingers and nails. Initially, the user should cover these areas with water, then introduce soap and rub the lather repeatedly across all areas of the hand.
- After handwashing, hands should be rinsed and dried with a clean towel.
- If any type of gel is used (alcohol, ethanol or non-alcoholic), the amount used should cover the hands and fingers entirely and be rubbed in until dry, usually for a minimum of 30 seconds.
- If gloves are being used after handwashing, hand lotion that does not compromise the integrity of the gloves can be used twice daily to minimize skin irritation.
- Fingernails should be kept short and trimmed.

- Dispose of dressings, bandages, sharps, gloves and soiled clothing safely and correctly, while continuing to cover your hands (e.g. use gloves or banana leaves). Wash your hands immediately afterwards.
- When soap is not available, ash can be used as an alternative to clean hands.

Education considerations

Context considerations

- There are large parts of the world where soap, clean water, hand sanitizer or other hand hygiene options may be unavailable (Tharaldson & Moore, 2018). Discuss the use of ash or other rinse-free methods to clean one's hands (Munn et al., 2020; Paludan-Müller et al., 2020).
- In community-based learning, hand hygiene strategies may be effective, particularly when combined with sanitation programmes (De Buck et al., 2017).
- During an epidemic or pandemic, frequent handwashing is essential to curb the transmission of the virus or bacterium. Discuss with learners how this can best be communicated and implemented in their context and what barriers and challenges need to be considered.
- Parents, caregivers and community health workers are important learner audiences for this topic due to their contact and influence in the home and among family members.

To promote handwashing as a good health behaviour beyond first aid education:

- Consider developing motivational handwashing messages and activities to make handwashing appealing to young children (J. Watson et al., 2019). Test the messages with the target group for more likely behaviour change. Posters and stickers with messages can also be effective (Appiah-Brempong et al., 2018).
- Handwashing campaigns and promotions in schools can be effective. Consider using peer learning to develop sustainability and culture change, and to promote self-efficacy amongst children (Appiah-Brempong et al., 2018).
- Children are the most effective agents for behaviour change in every community. Develop school programming that educates children and enables them to share messages and content with others at home.

Facilitation tips

- Encourage learners to wash their hands and use hand sanitizer at the beginning of a first aid course. This reflects good practice and can be a good way to start a discussion on the topic.
- If appropriate, encourage learners to wash their hands every time there is a practical session—do it rather than just talk about it.
- Highlight the importance of hand hygiene as an effective way to prevent the spread of infection.
- Discuss what to include in a first aid kit for hand hygiene. Kits should have an ethanol-based product of 70% ethanol, or an alcohol-based product of 60% (e.g. N-propanol, isopropanol), or more. If non-alcohol-based sanitizers are used because of the context, they must contain polymeric biocides and virucides.

Facilitation tools

- Get learners to develop visual cues, such as posters, to support good hygiene practices.
- Use songs or rhymes to help people experience how long 20 seconds is.
- Identify appropriate locations for posters and other media that promote hand hygiene, such as washrooms (Hamilton, 2019).
- Use videos to show how appropriate handwashing keeps people safe by ensuring that viruses and bacteria can be washed away. Videos can be found online or made in the local language using smartphones.

Scientific foundation

Systematic reviews

We used five systematic reviews as the scientific foundation for this topic.

Hand hygiene interventions

Jefferson et al. (2020) completed a Cochrane systematic review showing moderate-certainty evidence from seven studies involving 44,129 participants for the probable benefit of hand hygiene to decrease the number of people catching acute respiratory infection. Low-certainty evidence was found for the more strictly defined outcomes of influenza-like illness (ten studies) and lab-confirmed influenza (eight studies), suggesting that hand hygiene makes little or no difference. When pooling all 16 studies for the composite outcome of acute respiratory infection, influenza-like illness or lab-confirmed influenza, low-certainty evidence showed that hand hygiene may offer a benefit with an 11% relative reduction of respiratory illness. Few studies measured and reported harms; skin irritation in people using hand sanitizer was mentioned.

Alcohol-based solutions

A systematic review about the use of alcohol-based solutions in hospitals as an option for hand hygiene (Picheansathian, 2004) included 26 studies that looked at effectiveness in reducing microorganisms and 14 that looked at adverse events (skin problems). In summary, it was demonstrated that alcohol-based hand rubs remove bacteria, viruses, fungi and multiple drug-resistant microorganisms more effectively than non-medicated soap or other antiseptic agents and water from the hands of health care workers. At equal concentrations, N-propanol was shown to be the most effective alcohol (of those commonly used) and ethanol the least effective. Six of the 26 studies looked at various concentrations of alcohol-based solutions and isopropanol 90% was shown to be as effective in antimicrobial activity as N-propanol 60%. Ethanol-based solutions were most effective if they contained at least 70% ethanol. When it comes to skin irritation, it was shown that alcohol-based solutions are less irritating on skin than soap and water or other antiseptic detergents; however, frequent use of alcohol can dry the skin.

Hand cleaning with ash

The Cochrane systematic review by Paludan-Müller et al. (2020) addressed the use of ash for cleaning one's hands. The review was uncertain whether cleaning the hands with ash effectively reduces the spread of viral or bacterial infections or causes harm compared to using soap or other well-known materials. Studies show that using ash when soap and water are not available to wash hands has been effective in removing some types of bacteria.

Education interventions

The Cochrane systematic review of Gould et al. (2017) concluded there was limited evidence in favour of hand hygiene education for healthcare workers to produce a statistically significant decrease in respiratory outbreaks, MRSA infections requiring hospitalization, MRSA acquisitions, primary bloodstream infections and MRSA colonizations. Additionally, a statistically significant decrease in the presence of MRSA, the number of MRSA infections, the period of healthcare-associated infections and MRSA colonizations could not be demonstrated.

Promotional approaches

The Campbell systematic review of De Buck et al. (2017) explored promotional approaches and their effectiveness in changing handwashing and sanitation behaviour.

Non-systematic reviews

A cohort study showed that, for those who handle food, the best practices for fingernail sanitation include maintaining short fingernails and scrubbing them with soap and a nail brush when washing one's hands (Lin et al., 2003).

White et al. (2003) completed a non-randomized study in university dormitories. The study demonstrated that an increase in awareness of the importance of hand hygiene caused an increase in the frequency of handwashing and the use of alcohol gel hand sanitizer. This led to improved hand-hygiene practices overall.

Using literature data, Montiville et al. (2002) completed a risk assessment and observed that soap with an antimicrobial agent (specifically CHG) was more effective than regular soap. Hot air drying could increase the amount of bacterial contamination on hands, while paper towel drying caused a slight decrease in contamination. There was little difference in the efficacy of alcohol and alcohol-free sanitizers. Wearing a ring caused a slight decrease in the efficacy of handwashing.

Research at the University of Birmingham showed a correlation between countries with high adherence to frequent and appropriate handwashing at critical times to a lower COVID-19 exposure (Pogrebna & Kharlamov, 2020).

Education review

Insight for this review was drawn from The State of Handwashing in 2017 report by the Global Handwashing Partnership (2018). This review highlights disparities in access to water and soap for handwashing in households in low and middle-income countries as a key vector for disease transmission. An analysis from 51 low and middle-income countries showed large variations in the proportion of households with soap available at the handwashing place (i.e. from <0.1% in Ethiopia to 91.5% in Iraq). Within almost every country, households with higher wealth were more likely to have soap available than households with lower wealth. Rural healthcare facilities are also reported to have low availability of water, soap and hand-drying materials. People in urban areas had greater access to handwashing facilities than in rural areas, where access was close to zero in many countries.

The report also draws heavily on an extensive Campbell Systematic Review (De Buck et al., 2017), which explores promotional approaches and their effectiveness in changing handwashing and

sanitation behaviour. This review finds that community-based approaches to promote handwashing and sanitation efforts appeared to work better than social marketing approaches, sanitation and hygiene messaging and elements of a psychosocial theory. Programmes that combine hygiene and sanitation measures tend to show a greater impact than either one alone. Studies using a community-based approach, which include sanitation, were shown to increase handwashing at key times, as well as the use of latrines, safe disposal of faeces and reduction of open defecation.

Studies cited in the State of Handwashing 2017 review include a study by Appiah-Brempong et al. (2017) to design a hand hygiene intervention framework for schools. It considers that self-efficacy and enhancement of behavioural cues could bridge the intention-behaviour gap for handwashing in schools. They conclude that peer-led educational campaigns are a promising strategy for improving self-efficacy, while cues to action, including posters and stickers, can trigger proper hand hygiene practices.

Studies in the State of Handwashing review that identify barriers faced in some contexts include one by Odu et al. (2017). It reveals that among mothers, caregivers and schoolchildren in Nigeria, the availability of handwashing facilities with a reliable water source and soap influences handwashing practice. Even when caregivers have sufficient knowledge and positive attitudes regarding handwashing, these structural inadequacies can be barriers to proper hand hygiene.

Watson et al. (2019) considered children in an internally displaced person's camp in Iraqi Kurdistan concerning hand hygiene. Children in intervention households received transparent soaps with embedded toys, delivered within a short, fun and interactive household session with minimal, non-health-based messaging. The control group received plain soap delivered in a short, standard, health-based hygiene promotion session. After four weeks, children in the intervention group were more likely to wash their hands with soap after key handwashing occasions than expected in the counterfactual (if there had been no intervention), based on the comparison to children in the control group.

A Cochrane systematic review was conducted (Munn et al., 2020) to assess the effectiveness of rinse-free handwashing to reduce absenteeism due to illness in preschool and schoolchildren compared to no handwashing, conventional handwashing with soap and water or other hand hygiene strategies. This review identified a small yet potentially beneficial effect of rinse-free handwashing regimes on illness-related absenteeism. However, the certainty of the evidence that contributed to this conclusion was low or very low.

Oxygen administration

Key action

If specifically trained to do so, give supplementary oxygen in the circumstances defined below until emergency medical care is available.

Introduction

Giving oxygen to a person with a severe illness or injury is generally accepted practice, although there is no evidence for its overall effectiveness. Providing supplementary oxygen is not a routine first aid step, as many emergencies do not deprive the person of oxygen. Additionally, administering oxygen may cause the body (and therefore the blood) to take in too much oxygen and this may harm the person. However, under specific circumstances, oxygen administration may be beneficial but should be provided by a specifically trained first aid provider.

Guidelines

- A first aid provider should not give supplementary oxygen to an adult with a suspected stroke unless the first aid provider is trained and recognizes the person as hypoxic.*
- If the first aid provider is trained and oxygen is available:
    - The provider may give oxygen to a person experiencing chest pain if they recognize the person as hypoxic.*
    - The provider may administer oxygen to a person who has drowned and is having difficulty breathing or is in respiratory distress until arterial oxygen saturation or the partial pressure of arterial oxygen can be measured.*
    - The provider may give oxygen to a person who is in cardiac arrest during CPR, but doing so should not delay CPR.*

Good practice points

- Although high-flow oxygen should in general be avoided in patients with chronic obstructive pulmonary disease with difficulty breathing in the out-of-hospital setting, high-flow oxygen should not be withheld in the presence of life-threatening hypoxaemia (oxygen saturation <88%).
- Supplemental oxygen for resuscitation of a person who has drowned may be used if available, but should not delay CPR, including opening the airway and providing rescue breaths and chest compressions as needed.
- When available, trained providers use the highest possible oxygen concentration during pre-hospital resuscitation for adults and children.
- Until emergency medical care is available, the administration of supplementary oxygen is reasonable for a person:
    - after exposure to carbon monoxide
    - experiencing decompression illness (e.g. a scuba diver)
    - experiencing breathing difficulties
    - experiencing severe hypoxia (SpO2 at 94% or less).

- If the first aid responder has been trained in transcutaneous pulse oximetry and has a proper tool for measurement, it is ideal to taper oxygen supplementation to maintain oxygen saturation at 94% (at sea level).
- When a first aid provider trained in oxygen use administers oxygen to a person with acute difficulty breathing who confirms that they have chronic obstructive pulmonary disease, it is suggested that pulse oximetry be used, and that oxygen be titrated to maintain an oxygen saturation between 88% and 92%.
- The use of a pulse oximeter for first aid assessment should not supersede or replace physical assessment.

Education considerations

Context considerations

- Local laws, regulations and processes, including liability protection, may dictate whether a first aid provider can give supplementary oxygen to an ill or injured person.
- Programme designers may need to adapt how they implement this topic according to the educational opportunities available in their area, such as the availability of equipment.

Learner considerations

- Oxygen administration is not typically considered a routine first aid element, but in certain situations, it may be suitable for some learners to learn about it.
- Oxygen administration may not be feasible for some learners, depending on their line of work or activities in which they participate. For example, a remote rescue team may not be able to carry bulky equipment to provide supplementary oxygen and, therefore, may be less likely to use this topic.
- First aid providers who use pulse oximeters for the assessment of acute illness or injuries should be proficient in their use and understand their limitations, including equipment factors, environmental considerations and patient-specific factors that may produce inaccurate and unreliable readings.

Facilitation tips and tools

- Emphasize the importance of understanding the logistical aspects of the equipment, including how to maintain and store it, as well as how to care for the compressed gas cylinders. Learners should also be aware of and follow any local regulatory testing and inspections.
- Emphasize that it is critical that learners take extra precautions when using oxygen administration equipment as it can be a fire hazard. Learners must complete the necessary training on how to use the equipment if it is relevant to them.
- The oxygen saturation reading from a pulse oximetry reading often determines the need for oxygen. Therefore, learners may have to complete additional training on their use.
- Provide time for learners to practise using the different devices associated with administering oxygen, such as nasal prongs, simple masks or partial rebreather masks.
- Develop scenarios that assess learners' ability to determine when to use oxygen administration, the potential benefits and how to do it safely, as well as how to store the equipment properly.

Scientific foundation

Although supplemental oxygen has traditionally been advocated as a beneficial treatment across various conditions, recent evidence suggests potential harm from excessive oxygen administration in certain patient populations, such as those with suspected myocardial infarction. Given the possibility of supplemental oxygen use in first aid scenarios, it is essential for first aid providers to understand both its potential risks and benefits.

Supplementary oxygen and chronic obstructive pulmonary disease

The International Liaison Committee on Resuscitation (ILCOR) First Aid Task Force initiated a continuous evidence evaluation process with a 2015 systematic review on the use of supplemental oxygen by first aid providers (Singletary et al., 2015). This review identified very low-certainty evidence for critical outcomes such as survival and therapeutic endpoints (a composite of death, the need for assisted ventilation and respiratory failure) based on one observational study, which showed no benefit of supplemental oxygen for acute exacerbations of chronic obstructive pulmonary disease (COPD).

Regarding shortness of breath, very low-certainty evidence from one randomized controlled trial involving terminal cancer patients with dyspnoea and hypoxaemia indicated a benefit from supplemental oxygen. Moderate-certainty evidence from three randomized controlled trials demonstrated improved oxygen saturation with supplemental oxygen. However, low-certainty evidence from a meta-analysis and four randomized controlled trials found no benefit for shortness of breath in advanced cancer patients without hypoxaemia. For decompression injuries, very low-certainty evidence from one observational study suggested a benefit from supplemental oxygen in first aid settings.

Since the 2015 review, the topic has not been extensively updated. To address this gap, the ILCOR First Aid Task Force conducted a scoping review in 2022 for the 2023 Consensus on Science with Treatment Options (CoSTR) (Macneil et al., 2022). While no new articles directly answered the review question, some relevant findings emerged. A cluster-randomized trial by Austin et al. (2010) compared high-flow oxygen (8–10 L/min) to titrated oxygen (targeting 88%–92% oxygen saturation) in EMS-treated patients with acute COPD exacerbations. The study reported lower mortality in the titrated oxygen group.

A Cochrane systematic review by Kopsaftis et al. (2020) included one study of 214 adults with acute COPD exacerbations treated by paramedics en route to the hospital. Titrated oxygen, administered via nasal prongs to achieve arterial saturation of 88%–92%, reduced prehospital and in-hospital mortality, with two deaths in the titrated group compared to 11 in the high-flow oxygen group. No other adverse events were reported. However, as this review included only one study with a small number of deaths, confidence in the observed difference between treatments remains low, and the evidence is of low certainty.

Supplementary oxygen and heart attack (acute coronary syndrome)

A Cochrane systematic review on oxygen use in people with a heart attack identified evidence from five randomized controlled trials that compared people who had a suspected or proven heart attack and were given inhaled oxygen to a similar group of people given air (evidence is current as of June 2016) (Cabello et al., 2016). These trials involved a total of 1,173 participants, 32 of

whom died. Death rates were similar in both groups (very low-certainty evidence). Regarding pain, there was no effect of oxygen on pain relief when pain was directly measured, nor when trials measured opiate use as a surrogate for pain (low-certainty evidence). Concerning complications following a heart attack, there was no clear effect of oxygen on a range of complications in the oxygen group compared to the air group (low-certainty evidence). Together, there is no evidence to support the routine use of inhaled oxygen in people with a heart attack, and we cannot rule out a harmful effect.

A more recent systematic review and meta-analysis by Abuzaid et al. (2018) included a total of seven studies with 3,842 people who received oxygen therapy in post-acute myocardial infarction (heart attack) settings and 3,860 people who did not. High-certainty evidence was identified showing that, compared to no oxygen, oxygen therapy did not decrease the risk of all-cause mortality, recurrent ischaemia or myocardial infarction, heart failure or the occurrence of heart arrhythmias. These findings confirmed that there is no substantial benefit to routine oxygen therapy in people with acute myocardial infarction.

Supplementary oxygen for acute stroke

ILCOR conducted a systematic review on the use of supplemental oxygen for acute stroke (Chang et al., 2020), incorporating evidence from eight randomized controlled trials and one retrospective observational study. A subsequent evidence update conducted in 2022 did not identify any new studies that would alter the findings of the initial review.

For the outcome of survival at one week, three months, six months and one year, no benefit could be shown with giving supplementary oxygen (moderate-certainty evidence from three randomized controlled trials). Also, for neurological outcomes at one week, three months or six months, no benefit could be shown in six randomized controlled trials and an observational study (moderate- to very low-certainty evidence). However, one of these randomized controlled trials showed a higher chance of improvement for one of its outcomes, “improvement of NIH stroke scale score of more than four at one week” (moderate-certainty evidence), and a separate randomized controlled trial also showed benefit at seven months (low-certainty evidence).

For the outcome of quality of life, no benefit of supplementary oxygen was shown in two randomized controlled trials, and one randomized controlled trial even showed a lower quality of life (low-certainty evidence). One observational study also looked at complications and could not show an association between supplementary oxygen and pneumonia at hospital discharge and pulmonary edema, or the use of noninvasive positive-pressure ventilation. However, it showed a lower rate of hospital-acquired pneumonia and a higher rate of tracheal intubation and respiratory complications (very low-certainty evidence).

Supplemental oxygen for drowning

Drowning incident

A scoping review by Bierens et al. (2020) for the 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendation found insufficient specific evidence to guide the prehospital administration of oxygen therapy in drowning incidents. However, the primary cause of death in drowning is inadequate oxygen delivery to vital organs, such as the heart and brain, emphasizing the critical

importance of promptly restoring oxygenation. Indirect evidence identified in the review suggests that supplemental oxygen is frequently required for drowning patients.

Research from other areas of resuscitation science has demonstrated that both sustained hypoxia and hyperoxia are associated with adverse outcomes. While pulse oximetry may be unreliable, particularly after cold water immersion, it can support the continuous titration of FIO_2 (fraction of inspired oxygen) where feasible, following the restoration of spontaneous circulation.

In the absence of specific research on oxygenation in drowning, the existing ILCOR Treatment Recommendation for oxygenation after return of spontaneous circulation (ROSC) should be followed. This involves the initial use of 100% inspired oxygen, transitioning to titrated oxygen delivery to maintain arterial oxygen saturation within the normal range once arterial oxygen saturation or partial pressure of arterial oxygen can be measured.

Cardiac arrest following drowning

The ILCOR scoping review also searched for studies about the pre-hospital use of oxygen following a submersion incident, but no studies were identified (Bierens et al., 2021), even after the 2023 evidence update (Berg et al., 2023a; Berg et al., 2023b). Indirect evidence from observational studies found associations between hypoxia, oxygen administration and worse outcomes. In the absence of specific research about the use of oxygen in drowning, ILCOR concluded that the existing treatment recommendation for oxygen administration after the return of spontaneous breathing applies. This guides first aid providers to avoid hypoxaemia and hyperoxia, using 100% inspired oxygen until arterial oxygen saturation or the partial pressure of arterial oxygen can be measured. If the person is breathing normally, supplemental oxygen with a target saturation of 94%–98% may be used.

When available, ILCOR recommends trained providers use the highest possible inspired oxygen concentration during pre-hospital resuscitation for adults and children in cardiac arrest following drowning (Good practice point).

Supplemental oxygen and CPR

During CPR

Historically, administering 100% oxygen during cardiac arrest has been considered appropriate whenever available. However, in other medical emergencies, the routine use of 100% oxygen is increasingly being questioned. For this topic, we reference the 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Soar et al., 2015) and the 2020 ILCOR evidence update (Berg et al., 2020; Soar et al., 2020).

No adult human studies directly compare maximal inspired oxygen concentrations with alternative oxygen concentrations during cardiac arrest.

For the critical outcome of survival to hospital discharge with a favourable neurologic outcome (Cerebral Performance Category [CPC] 1 or 2), very low-quality evidence from a single observational study of 145 out-of-hospital cardiac arrest (OHCA) patients measured PaO_2 levels

during CPR. The study found no significant differences in outcomes between intermediate PaO_2 and low PaO_2 levels, or between high PaO_2 and low PaO_2 levels.

For the important outcome of return of spontaneous circulation (ROSC), the same study indicated improved ROSC rates in patients with higher PaO_2 levels. Specifically, comparisons revealed better outcomes with intermediate PaO_2 versus low PaO_2, high PaO_2 versus low PaO_2, and high PaO_2 versus intermediate PaO_2.

In this study, all patients underwent tracheal intubation and received 100% inspired oxygen during CPR. The poorer outcomes observed in patients with lower PaO_2 levels during CPR may reflect greater illness severity rather than a direct effect of oxygen levels.

After ROSC

Preclinical studies suggest that hyperoxia may be harmful in the post–cardiac arrest period. However, the applicability of these findings to humans remains uncertain. This summary references the 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Soar et al., 2015) and the 2020 ILCOR evidence update (Berg et al., 2020; Soar et al., 2020).

30% versus 100% inspired oxygen for 60 minutes after ROSC

For the critical outcomes of survival to hospital discharge with favourable neurologic outcome (CPC 1 or 2) and survival to hospital discharge, one randomized controlled trial involving 32 out-of-hospital cardiac arrest (OHCA) patients found no significant difference between administering 30% inspired oxygen versus 100% inspired oxygen for 60 minutes after return of spontaneous circulation (ROSC).

Hyperoxia versus normoxia

Survival to 12 months with favourable neurologic outcome (CPC 1 or 2)

One study of very low-quality evidence found no harmful effects associated with hyperoxia during the first 24 hours of ICU care.

Survival to hospital discharge with favourable neurologic outcome (CPC 1 or 2)

Low-quality evidence from observational studies showed conflicting results. Two studies reported worse outcomes with hyperoxia compared to normoxia.

Neurologic outcomes (CPC 1 or 2)

- Very-low-quality evidence from one single-centre study of 170 ICU patients treated with therapeutic hypothermia suggested worse outcomes with higher maximum PaO_2 levels in the first 24 hours.
- Another single-centre study of 193 ICU patients found no association between the first PaO_2 level after ROSC and outcomes.
- A third single-centre study of 184 ICU patients reported no association between oxygen exposure over the first 24 hours of ventilation and outcomes in both unadjusted and adjusted analyses.

- Two additional studies used surrogate measures of favourable neurologic outcomes
    - One study reported worse independent functional survival at hospital discharge with hyperoxia compared to normoxia.
    - Another study found no difference in discharge to home between hyperoxia and normoxia.
- Survival to discharge (or 30-day survival)
    - Seven observational studies of very-low-quality evidence reported conflicting results. Four studies indicated worse outcomes with hyperoxia compared to normoxia.
    - One study found that a 100 mm Hg increase in PaO_2 was associated with a 24% increase in mortality risk.
- Survival to ICU discharge
    - Two observational studies of very-low-quality evidence found no harm from hyperoxia.

Hypoxia versus normoxia

- Survival to discharge (or 30-day survival)
    - Very-low-quality evidence from two of three observational studies indicated worse outcomes with hypoxia compared to normoxia. One study found hypoxia associated with higher hospital mortality (60% vs. 47%) but no difference in discharge to home.
    - A third study reported no significant difference in outcomes between hypoxia and normoxia based on PaO_2 levels during the first 24 hours in the ICU.
- Survival to ICU discharge
    - One observational study of very-low-quality evidence found hypoxia associated with worse outcomes.

Overall, evidence regarding the optimal oxygen concentration during post-cardiac arrest care remains of very low certainty due to serious biases, confounding factors and inconsistent results across studies. Further research is required to clarify the risks and benefits of hyperoxia, normoxia and hypoxia in this critical setting.

Supplemental oxygen for carbon monoxide poisoning

For the use of supplemental oxygen for carbon monoxide poisoning in the out-of-hospital setting, no clinical studies have been identified since 2023.

A systematic review on oxygen and carbon dioxide targets in adult patients with return of spontaneous circulation after cardiac arrest recommends avoiding hypoxaemia and hyperoxia (Berg et al., 2020; Soar et al., 2020). The review's guidance is to use 100% inspired oxygen until arterial oxygen saturation or the partial pressure of arterial oxygen can be measured.

One older case series (Smith & Brandon, 1970) reported the prehospital and in-hospital management and clinical course of 206 patients with carbon monoxide poisoning, whereas all the literature reviews and guidelines (Jüttner et al., 2021) focused on in-hospital management. All articles commented on the need for immediate treatment with supplemental high-concentration oxygen.

Public Health England and the Canadian Centre for Occupational Health and Safety recommend that oxygen be administered to someone with carbon monoxide intoxication (Canadian Centre for Occupational Health and Safety, 2017; Public Health England, 2019).

Supplemental oxygen and diving emergencies

The use of supplemental oxygen is outlined in the 2024 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Greif et al., 2024a; Greif et al, 2024b).

Three case series investigated the use of oxygen in decompression sickness, including one study that specifically analysed first aid oxygen use in 1,045 cases from a sequential series of 2,231 diving injury reports. The median time to oxygen administration was 2.2 hours after symptom onset and four hours after surfacing.

Key findings included:

- Persistent complete symptom relief in 14% of cases.
- Symptom improvement in 51% of cases.
- A reduction in the odds of requiring multiple recompression treatments when oxygen was administered at any time after surfacing.

Additional articles identified in the review included literature reviews, a summary article from a medical journal and one experimental study. The experimental study, conducted by Blake et al., 2020, examined tissue oxygenation levels in healthy divers using various noninvasive oxygen delivery devices and flow rates.

These findings highlight the potential benefits of first aid oxygen administration in managing diving emergencies and underscore the need for further research to optimize its application.

Pulse oximetry use in the first aid setting

Pulse oximetry is a simple, noninvasive tool for assessing respiratory and circulatory health in healthcare facilities and out-of-hospital settings. Recently, this technology has become increasingly prevalent in home first aid kits—particularly during the COVID-19 pandemic—and in wearable devices such as fitness bands and smartwatches. In urgent situations, pulse oximetry provides valuable information regarding oxygen saturation levels.

The utility of pulse oximetry was the focus of a 2022 ILCOR scoping review (Singletary et al., 2023), with an updated literature search conducted in 2023 for the 2023 ILCOR Consensus on Science with Treatment Recommendations (CoSTR) (Berg et al., 2023a; Berg et al., 2023b). However, all reviewed articles were excluded because they evaluated patients enrolled in home monitoring programmes for known, diagnosed conditions.

Although the review did not aim to assess the accuracy of pulse oximetry based on skin pigmentation, some studies addressing this issue were identified:

- One study found greater discrepancies between oxygen saturation measured by pulse oximetry and arterial blood gas measurements in individuals who identified as black, Asian or mixed ethnicity compared to those who identified as white, with pulse oximetry generally overestimating oxygen saturation.

- Another study reported that black patients experienced nearly three times the frequency of occult hypoxaemia (hypoxaemia undetected by pulse oximetry) compared to white patients.

Limitations of pulse oximetry

Despite its widespread availability, the effectiveness of pulse oximetry in first aid scenarios remains inconclusive due to insufficient evidence to support a recommendation for or against its use by first aid providers. Concerns regarding its limitations include:

- Systematic overestimation: Higher inaccuracies in individuals with darker skin pigmentation.
- Environmental and physical factors: Dysfunction in extreme temperatures, movement, vibration (e.g., during transport) and interference from external light sources such as sunlight.
- Patient-specific factors: Heart rhythm and cardiac output, chronic respiratory disease, nail thickness, nail polish, skin perfusion and skin temperature.
- Device limitations: Accuracy and calibration of devices, differences in the size and orientation of sensors and light sources, battery level/charge and device condition, such as being dusty, dirty or damaged. Most of the pulse oximeters falsely display normal or high oxygen saturation in carbon monoxide poisoning, although some new types of pulse oximeters can measure the blood level of carbon monoxide too.
- Regulatory concerns: Many over-the-counter pulse oximeters are not approved or cleared by local regulatory agencies.

While pulse oximetry may offer utility in specific first aid contexts, its reliability is influenced by numerous factors, including environmental conditions, device quality and user demographics. These limitations underscore the need for further research and regulatory oversight to ensure accuracy and efficacy in first aid applications.

RESUSCITATION

Unresponsive and breathing normally

Key action

Maintain an open airway so the person can continue to breathe normally.

Introduction

An unresponsive and breathing person has normal, regular breaths (the air moves through the mouth and/or nose at an even pace without any irregular sounds like gurgling), but does not respond to any sound or touch from another person. A person may become unresponsive due to an injury (e.g. hitting their head) or a medical condition (e.g. diabetic emergency) that may indicate a greater danger to their health. Even if the person is breathing regularly, they may still be at risk because their muscles could relax, causing their tongue to fall back and block their airway. First aid providers should consider accessing medical care.

If the unresponsive person's breathing stops, becomes noisy, or they sound like they are gasping for air or hardly breathing, they may be in cardiac arrest. See Unresponsive and abnormal breathing for baby and child or adolescent and adult or chest pain.

Guidelines

- If there is no risk of a spine injury, first aid providers should maintain an open airway by moving the person onto their side and tilting their head back (recovery position).*

Good practice points

- If the first aid provider finds a person motionless, they should check for responsiveness and breathing immediately. The provider should take up to 10 seconds to check for normal breathing.
- In a non-traumatic incident (no risk of spinal injury), if the first aid provider cannot move the person into the recovery position, they can use the head-tilt-chin-lift or jaw thrust manoeuvres to maintain an open airway.
- The first aid provider should avoid moving a person with a suspected traumatic spinal injury if:
    - Medical help will arrive soon. The head-tilt-chin-lift or jaw thrust manoeuvres can be used to maintain an open airway on a person with a suspected spine injury. The jaw thrust manoeuvre may result in less cervical spine movement than the head-tilt-chin-lift manoeuvre.
    - Medical help is far away and there is more than one first aid provider present. Providers can turn the person to a side-lying position while maintaining spinal alignment.
- A person who is pregnant and unresponsive may be placed in the recovery position on their left side. This prevents compression of blood vessels that feed the uterus.
- The cause of unresponsiveness (e.g. diabetic emergency, poisoning, head injury) should be identified if possible.

- First aid providers should always access emergency medical services (EMS) for an unresponsive person who is breathing normally, as lack of response may indicate a serious condition.
- The AVPU scale, which stands for Alert – Verbal – Pain – Unresponsive, describes the type of stimulus a person reacts to and can be used to determine the level of responsiveness. A first aid provider using the AVPU scale should maintain an open airway for any person reacting to Pain or who is Unresponsive.

Chain of survival behaviours

Prevent and prepare

- Follow instructions from healthcare providers to manage any pre-existing health conditions.
- Wear and use appropriate safety equipment when working or participating in leisure and work activities.

Early recognition

Check for a response by gently shaking the person's shoulders or, if they are a baby, tapping their foot. Speak loudly and clearly, and ask a question such as, "Are you alright?" If the person responds, continue with your assessment.

If the person is unresponsive, they will not move or respond to any noise or touch. If the person does not respond:

1. Check for breathing: Keeping their airway open, look, listen and feel for normal breathing for up to ten seconds. Look for chest or abdominal movement; listen for breathing sounds; feel for air on your cheek.
2. Open the airway: Start with the person on their back. Gently tilt the head back (or into a neutral position for a baby) until the mouth falls open, and then lift the chin.

First aid steps

If the person is breathing normally:

1. Move them onto their side and tilt their head back (or into a neutral position if it is a baby) to maintain an open airway. This is called the recovery position. A baby can be held in this position in your arms.
2. Access EMS.
3. Monitor the person for any changes in their breathing or level of response. If possible, try to establish why the person is unresponsive.

CAUTION
If you suspect a spine injury, maintain an open airway by using the head-tilt-chin-lift or jaw thrust manoeuvres only and access EMS.

If medical care is some time away and if there is more than one first aid provider present, you can turn the person into a side-lying position while maintaining spinal alignment.

If the person is breathing abnormally (gasping, taking irregular breaths or not breathing), start CPR immediately.

Access help

- When speaking to EMS, specify that the person is unresponsive and breathing normally. If you know what caused the person to become unresponsive, communicate that information too.

Recovery

If the person became unresponsive due to an existing health condition, they should try to quickly recognize any warning signs of it occurring again. This may enable them to get into a comfortable position and call for help.

Education considerations

Context considerations

- International resuscitation councils differ slightly in the sequencing of actions for activating emergency services in cases of an unconscious child or infant. For example, the European Resuscitation Council (ERC) emphasizes early activation of emergency services before assessing breathing, while the American Heart Association (AHA) recommends activation after identifying cardiac arrest (unconsciousness with abnormal or absent breathing). Although these approaches are largely aligned in practice, first aid education should follow the recommendations and legal requirements of the relevant regional or national authority, taking into account the availability and role of emergency medical services in the local context.
- Programme designers should use the recovery position technique advised by the local medical authorities.

Learner considerations

- When practising how to put an unresponsive person on their side, consider the learner group's needs and sensitivities regarding gender and culture (particularly regarding touching). Ask the learners how they would like to practise this manoeuvre.
- Talk to learners who have disabilities that prevent them from moving a person onto their side and ask how they might instruct another person to do this, or what other methods they might use to maintain an open airway.
- Consider teaching learners who might come into contact with spinal injuries (e.g. lifeguards or taxi drivers) about recognizing a Spinal injury and how to apply the head-tilt-chin-lift or jaw thrust manoeuvres. Ensure they understand that this manoeuvre results in the least amount of movement of the spine.

Facilitation tips

- Run relevant and realistic scenarios that allow learners to practise their general approach, recognition and first aid skills to care for an unresponsive person who is breathing.
- When facilitating learning about putting someone in the recovery position, focus on the desired outcome of the person (they are on their side and their airway is open) and keep the steps to achieving this as simple as possible.
- Discuss the mechanics of the tongue with regard to keeping an open airway. When a person is unresponsive, their muscles relax, which can cause the tongue to block the airway. Emphasize the importance of tilting the head back, as that will pull the tongue forward and keep the airway open. Moving the person onto their side maintains an open airway as the tongue will fall forward and any blood or vomit can drain out.
- Identify that a person can suddenly become unresponsive (due to a stroke, electrocution, head injury, etc.) or gradually (by certain poisonings or a diabetic emergency).
- Identify that while an altered mental status is frequently a separate issue, the person may display signs before becoming unresponsive. First aid providers may be able to intervene before the person becomes unresponsive.

Facilitation tools

The AVPU responsiveness scale may be useful for some learners, particularly those who use their first aid skills often and have a regular refresh of knowledge. The AVPU check is carried out as follows:

A Alert	• The person is aware of their environment, opens their eyes spontaneously and can follow instructions.
V Verbal	• The person does not open their eyes spontaneously, and only responds to a verbal cue when it is said directly to them.
P Pain	• The person does not open their eyes spontaneously, nor respond to verbal cues and only reacts directly to painful stimuli (like squeezing the fingers or pinching the back of the hand). The person may cry, moan or move.
U Unresponsive	• The person does not react, either to verbal or painful stimuli.

For most first aiders, the most important distinction is between responsive and unresponsive, where alert indicates responsiveness and verbal, pain or unresponsive are abnormal, indicating unresponsiveness.

Learning connections

- Explore some conditions that could cause unresponsiveness: head injury, stroke, diabetic emergency and seizure.

- Differentiate between someone feeling faint and someone who is unresponsive and breathing normally. Someone who faints should be unresponsive only for a very short amount of time.

Scientific foundation

Systematic reviews

Recovery position

The International Liaison Committee on Resuscitation (ILCOR) conducted a scoping review in 2020 regarding the recovery position for individuals with a decreased level of consciousness due to non-traumatic causes, who do not require rescue breathing or chest compressions (Singletary et al. 2020a, Singletary et al. 2020b). The review includes 31 studies, one case report and two letters to the editor. It covers a range of participants, including those with reduced responsiveness due to medical conditions (e.g. stroke), drug overdose or sleep-disordered breathing, as well as healthy individuals, people under medically induced unconsciousness and cadaveric models with spine instability. Several recovery positions were studied. One study, where a decreased level of responsiveness was the result of an overdose, suggested that lying down in a semi-raised position may be preferable to a side-lying position; however, additional studies need to confirm this finding. For the other medical causes of decreased mental status, the side-lying position was associated with beneficial outcomes. The studies on sleep-disordered breathing found that side-lying positioning improved apnoea, hypopnoea and oxygen desaturation. However, they may not be directly applicable to the use of the recovery position for people with a decreased level of responsiveness from a medical, toxicological or non-traumatic cause. An evidence update in 2024 did not reveal any new studies (Greif et al., 2024a; Greif et al, 2024b).

The Centre for Evidence-Based Practice (CEBaP) conducted an evidence summary comparing the HAINES (High Arm in Endangered Spine) position to a lateral recovery position. The review includes three experimental studies, one study with healthy volunteers and two studies with human cadavers, comparing the HAINES position (with both legs bent at the knee), modified HAINES position (with one leg bent at the knee) and the side-lying trauma position (which requires two rescuers and the use of a cervical collar) to the side-lying recovery position. It was shown that the HAINES position resulted in a statistically significant decrease of movement in the cervical region and a decrease of the spinal range of linear motion, compared to the side-lying recovery position. However, the HAINES position resulted in a statistically significant increase in movement in the thoracolumbar region, compared to the side-lying recovery position. It was shown that the modified HAINES position resulted in a statistically significant decrease in the spinal range of linear motion, compared to the side-lying recovery position. The review found that the side-lying trauma position resulted in a statistically significant decrease in the spinal range of angular motion, compared to the side-lying recovery position. A statistically significant difference in a range of other motion outcomes could not be demonstrated for any of these alternative positions. No other outcomes were measured, and evidence with people with a spine injury is not available. Evidence is of very low certainty, and the results of these studies are

imprecise due to the small number of participants, the large variability of results and the lack of data.

A second CEBaP evidence summary compared the recovery position to only doing the jaw thrust, but no studies could be identified.

Use of the AVPU scale

CEBaP updated the evidence summary on the use of the AVPU scale to assess the level of consciousness in adults in 2025. The summary identified SIX diagnostic accuracy studies and one interrater reliability study, comparing the performance of the AVPU scale to the Glasgow Coma Scale (GCS) as a reference test. The studies provided evidence of very low certainty indicating that the AVPU scale and the (p)GCS (paediatric GCS) are equally sensitive and specific to identify impaired levels of consciousness in adults and in children. Based on one study, both scales also demonstrate similar interrater reliability. Given the user-friendliness of the AVPU scale over the (p)GCS, it is conceivable to recommend the use of the AVPU scale to assess the level of consciousness in adults and children. As the AVPU scale does not appear to be a sensitive or specific tool for identifying head injuries, it should therefore not be used for this purpose.

Non-systematic reviews

New lateral (side-lying) trauma position for cases of cervical spine injury

Hyldmo, Horodyski, Conrad et al. (2016) investigated the safety of the new side-lying trauma position in cervical spine injuries in a cadaver model study and found that in the standard recovery position, the range of motion for lateral bending was 11.9°. While both HAINES positions caused a similar range of motion, the new side-lying trauma position resulted in 2.6° less (P = 0.037). The range of motion of the head, neck and upper body in the standard recovery position was 13.0 mm. In comparison, the HAINES positions showed significantly less motion (5.8 and 4.6 mm, respectively), while the side-lying trauma position showed even less (4.0 mm, P = 0.067). The authors concluded that in unresponsive trauma people, the side-lying trauma position or one of the two HAINES techniques is preferable to the standard recovery position in cases of an unstable cervical spine injury.

In a cadaver study, the new side-lying trauma position and the well-established log roll manoeuvre resulted in comparable amounts of motion in an unstable cervical spine injury model (Hyldmo et al., 2017).

Clinical practice guideline

In a guideline based on a systematic review, Rehn et al. (2016) could not identify any evidence suggesting that placing a person with a spine injury in a side-lying position (including the use of a log roll) causes harm. Although the guideline was intended for professional responders, it can also apply to first aid providers. The guideline recommends the recovery position for all unresponsive people where there is no suspicion of trauma and where advanced airway management is not immediately available.

For unresponsive people with trauma, the recommendation is to turn them into a side-lying position while maintaining spinal alignment (strong recommendation, limited evidence). This

move would require two first aid providers. When spinal precautions are necessary, providers should use the head-tilt/chin-lift or jaw thrust manoeuvre in addition to manual in-line stabilization to reduce the risk of worsening any spinal injuries.

AVPU (Alert, Verbal, Pain, Unresponsive)

Romanelli and Farrell (2023) underlined that the AVPU scale is a quick and simple way of detecting altered mental status in a person. No formal training is necessary to use this score. First aid providers can use the tool in any prehospital setting as anything less than «A» is considered abnormal, indicating they should access medical care.

Unresponsive and abnormal breathing (adolescent and adult)

Unresponsive and abnormal breathing (baby and child)

Key action

Immediately start chest compressions and access emergency medical services (EMS).

Introduction

If a person's heart is unable to pump blood around the body, then this person is in cardiac arrest. The person will quickly become unresponsive and display signs of abnormal breathing (e.g. taking irregular or noisy breaths, or stop breathing altogether). When a person's heart is not working and they are not breathing, their body experiences a lack of oxygen. Vital organs, such as the brain or the heart, can start to deteriorate after a few minutes. Sudden cardiac arrest is one of the leading causes of death worldwide (Berdowski et al., 2010). Early recognition of abnormal breathing and starting cardiopulmonary resuscitation (CPR) can keep the person alive until defibrillation takes place, either by a first aid provider or professional responder.

The techniques of CPR need to be adapted depending on the size of the unresponsive person and the size of the first aid provider. In this context, an adolescent or adult is someone you think has gone through puberty. Use the following guidelines on an unresponsive adult or adolescent. If the person is an adolescent, consider giving rescue breaths with chest compressions. If the person looks like they are a child, follow the guidelines for Unresponsive and abnormal breathing (baby or child).

It is most important to do something. In the case of someone needing CPR, it is unlikely a first aid provider can make the situation worse for the person.

Guidelines

- If a person is unresponsive with abnormal breathing, it is reasonable to assume the person is in cardiac arrest.**
- Taking the pulse as the sole indicator of the presence or absence of cardiac arrest is unreliable.**
- When possible, a lone bystander with a mobile phone should call for help, activate the speaker or other hands-free option on the mobile phone, and immediately begin CPR with dispatcher assistance, if required.**
- If in doubt whether a person is experiencing cardiac arrest or not, the first aid provider should start CPR without concern of causing additional harm.**
- First aid providers who are trained, able and willing can give rescue breaths and chest compressions to all unresponsive adolescents and adults with abnormal breathing.*
- CPR may start with compressions rather than rescue breaths.*
- Perform chest compressions in the centre of the chest (i.e. the lower half of the sternum or breastbone) on adolescents and adults who are unresponsive with abnormal breathing.*
- Chest compressions should be performed at a rate of 100 to 120 per minute.**

- Chest compressions should be done to a depth of approximately 5 cm (2 inches); avoid a compression depth of more than 6 cm (2.4 inches).*
- When possible, first aid providers should perform chest compressions on a firm surface but should not significantly delay starting chest compressions to move the person.*
- First aid providers should avoid leaning on the chest between compressions to allow full chest wall recoil.*
- To mitigate the effects of fatigue, rotate the provider performing chest compressions every two minutes whenever possible.**
- The use of real-time CPR feedback devices is not recommended to improve resuscitation.**
- For those who are willing and able to provide rescue breaths, a ratio of 30 compressions and two rescue breaths (30:2) should be used on adolescents and adults who are unresponsive with abnormal breathing.**
- Interrupting chest compressions to deliver two rescue breaths should take less than ten seconds.**
- First-aid providers must give each mouth-to-mouth rescue breath within a one-second inspiratory time to achieve chest rise. The same initial tidal volume must be used with all persons regardless of the cause of the cardiac arrest.*
- When an automated external defibrillator is available, first aid providers should continue to perform CPR while the defibrillator is set up and pause only when it is ready for analysis and, if indicated, provides a shock.**
- In any setting, chest compressions should be resumed immediately after shock delivery for adolescents or adults who are unresponsive with abnormal breathing. Any pauses in chest compressions before and after the shock should be as short as possible.**
- First aid providers should use standard CPR protocols with obese persons.*
- First-aid providers should take appropriate safety (PPE and body substance isolation) precautions when feasible and when resources are available to do so, especially if the person is known to have a serious infection (e.g. HIV, tuberculosis, HBV or SARS).*

The following guidelines are specific to emergency medical dispatch centres and the professionals who work there.

- Emergency medical dispatch centres should implement a standardized algorithm or specific criteria to determine immediately if a person is unresponsive with abnormal breathing at the time of an emergency call.**
- Emergency medical dispatchers should be educated to identify unresponsiveness with abnormal breathing. This education should include recognition and significance of agonal breaths across a range of clinical presentations and descriptions.**
- Emergency medical dispatch centres should have systems in place where dispatchers can provide instructions to callers who will provide CPR.**
- Emergency medical dispatchers should provide chest compression-only CPR instructions to callers for adults and adolescents with suspected cardiac arrest.**

Good practice points

- First aid providers should perform chest compression for all patients in cardiac arrest.
- To achieve more effective chest compressions, the dominant hand should be placed against the sternum with the non-dominant hand over the dominant hand.

- If the person is an adolescent, CPR with rescue breaths is preferred.
- Adults receiving CPR will require advanced medical care. In contexts where this care is unavailable, first aid providers should prioritize the dignity of the person they are caring for.

Chain of survival behaviours

Prevent and prepare

- There are national and global organizations that research how to reduce the likelihood of cardiac arrest and set up national and regional cardiac arrest registers to define a strategy of intervention. Refer to your country's health authority for more information.
- Make healthy lifestyle choices to minimize certain risk factors such as high blood pressure, obesity, blood sugar level, hyperlipidaemia and renal dysfunction. Avoid activities such as smoking.
- Promote emergency phone numbers and other means to access help fast.

Early recognition

Two main mechanisms of cardiac arrest result in unresponsiveness and abnormal breathing. The first is when the heart stops (e.g. from a heart attack) and prevents the oxygen-rich blood from pumping around the body. This is the most common type in adults. The second type is when a person is unable to breathe oxygen into the body (e.g. due to drowning or strangulation). The person will have very little oxygen remaining in their blood and appear lifeless.

In the first few minutes after cardiac arrest, a person may have agonal breathing (an irregular and laboured breathing pattern, or gasping noisily). This type of breathing is not normal. If there is any doubt about whether breathing is normal, assume it is not. Similarly, if professional responders are unsure if a pulse is present, they should assume it is not. A short period of seizure-like activity may occur at the beginning of a cardiac arrest. Once the seizure stops, continue to assess the person.

Check for a response by gently shaking the person's shoulders. Speaking loudly and clearly, ask a question such as, "Are you alright?".

If the person responds, see the general approach.

If the person does not respond:

1. Open their airway: Gently tilt their head back and lift the person's chin. (You may need to turn the person onto their back to do this.)
2. Check for breathing: Keeping the airway open, look, listen and feel for normal breathing for up to ten seconds. Look for chest or abdominal movement; listen for breath sounds; feel for air on your cheek. Professional responders may also do a pulse check at this time.

Identify whether the person is an adult or adolescent. If they are a child, follow the approach for Unresponsive and abnormal breathing (baby or child).

First aid steps

If the person's breathing is abnormal or they are not breathing:

1. Immediately shout for help and ask bystanders to access EMS. If you are alone, access EMS yourself, either using a telephone with the speaker function or–if there is no phone available nearby–leave the person to access EMS. Do this as quickly as possible.
2. Begin chest compressions without delay; push down on the centre of the person's chest at a fast and regular rate (100–120 compressions per minute).
3. If able and willing, combine chest compressions with rescue breaths at a ratio of 30:2 (30 compressions followed by two breaths). Rescue breaths may be particularly beneficial for unresponsive individuals whose condition is related to hypoxia, such as drowning, choking, strangulation or opioid overdose. They may also be beneficial when a delay in defibrillation is anticipated. Each rescue breath should be delivered over approximately one second, producing visible chest rise. The provision of rescue breaths should not interrupt chest compressions for more than 10 seconds. If the first aider is unable or unwilling to provide rescue breaths, chest compressions alone should be continued.
4. If one is available, ask a bystander to bring an automated external defibrillator as soon as possible. Follow the voice prompts, interrupting chest compressions as little as possible.
5. Continue to give chest compressions and breaths unless otherwise instructed to pause (either by an automated defibrillator or professional responder). Pause compressions if the person shows signs of recovery, such as coughing, opening their eyes, speaking or moving purposefully and breathing normally.
6. If two or more first aid providers are present, alternate giving chest compressions and breaths every two minutes to prevent getting tired. Ensure that there is no interruption in compressions as the next person takes over.

Local adaptation

These local adaptations underscore the importance of safety, quality and respect in resuscitation efforts, particularly in challenging or remote scenarios.

Manual CPR during transport: Delivering manual CPR during transport poses significant risks to providers and can reduce the quality of compressions. EMS systems must assess these risks and, when feasible, use strategies to avoid them. Resuscitation is best performed at the scene unless there is a clear and justified need for transport. If transport is required, EMS providers should prioritize maintaining high-quality CPR throughout the journey.

Remote area transport: In circumstances where EMS or other advanced care options are unavailable, and transport from a remote location to medical care is necessary, continuous CPR should be performed on a firm surface during transit.

Dignity and respect: When EMS or advanced care is not accessible, it is critical to uphold the individual's dignity during all aspects of care and transport.

Drowning *and* Hypothermia *cases:* In situations involving drowning or hypothermia, there remains a possibility of a positive response to CPR even when defibrillation is not feasible. Continue to perform CPR in these situations for the best possible outcome.

Access help

- When speaking to EMS, very clearly explain that the unresponsive person is not breathing normally; this will prompt EMS to prioritize your case appropriately.
- Ask bystanders for help accessing EMS and providing CPR, as well as bringing and using an automated external defibrillator.
- An unresponsive person who is not breathing is unlikely to achieve spontaneous circulation from CPR alone. Their heart needs an electric shock from a defibrillator. It is vital that EMS arrive and a defibrillator is used.
- The survival of the person depends upon immediate and effective CPR; when accessing help, keep any interruptions to chest compressions minimal.

Recovery

- Even if the first aid provider has performed CPR and defibrillation and the person is now responsive and breathing normally, you must continue close monitoring until EMS arrives as the person may stop breathing again.

Education considerations

Supporting learners to have the confidence and willingness to attempt CPR on a person who is unresponsive and breathing abnormally is a priority for first aid educators. Remember that the opportunity to provide CPR is generally very low—some learners might never have to perform it. However, if such a situation does arise, learners need to be prepared for feelings of doubt, uncertainty and lack of confidence. Therefore, CPR education should always take these feelings into account, and support the learner to overcome them.

Context considerations

- Refer to and follow the guidance of regional resuscitation councils or other national protocols and tailor education accordingly.
    - Recognizing cardiac arrest:
        - Councils emphasize the recognition of abnormal breathing and the possibility of brief convulsions or emphasize the absence or abnormality of breathing in an unconscious person. It is an almost identical approach: some councils specify the possibility of brief convulsions that may delay recognition of cardiac arrest. For the general public, all organizations recommend starting CPR without checking for a pulse.
    - Activating emergency services (EMS):
        - Councils recommend calling emergency services before assessing breathing if the person is unconscious or recommend calling emergency services after identifying cardiac arrest (unconsciousness and abnormal or no ventilation). These approaches are practically identical, but the councils place greater emphasis on obtaining assistance from an EMS dispatcher as quickly as possible. This recommendation must be implemented according to the availability of the EMS system.
    - Firm surface for compressions
        - For some councils, immediate CPR is recommended, even on a bed, to avoid no-flow because lifting the victim delays treatment; other councils recommend a hard surface, but also state that moving the victim should not

delay CPR. In practice, these recommendations are very similar. Councils place greater emphasis on "never delaying CPR" and for the general public, organizations recommend starting CPR without checking for a pulse.

- Consult local regulators to consider differences in regulation and liability protection for first aid providers.
- Where EMS is available, learners should be encouraged to start compression-only CPR rather than hesitate as they consider the possibility of rescue breaths.
- In some countries, specifically those with a high rate of tuberculosis, rescue breaths may be discouraged. Teach first aid providers chest compression-only CPR (or additionally bag-valve-mask resuscitation if they are professional responders). See epidemic and health crises.
- In contexts where there is no EMS or access to advanced care, prepare learners for the likely death of the person who is unresponsive and has abnormal breathing. This should include telling them what to do according to local regulations and requirements for registering a death.

Learner considerations

- Prioritize training community members most likely to encounter cardiac arrest emergencies in CPR. Members include but are not limited to medics, police officers, firefighters and lifeguards. Consider that these groups, given their status and role in the community, might make effective educators for the general public (Tweed & Wilson, 1977). Despite advances in resuscitation science and standardized life-support methods, the overall survival rate of out-of-hospital cardiac arrests remains at less than 10% (Bobrow et al., 2010; Kazaure et al., 2013).
- Build on the motivation that people with family members who are at high risk of cardiac arrest due to illness might have to learn first aid (Huang et al., 2016).
- Adapt educational tools (e.g. mannequins and defibrillators), locations (e.g. waterfront scenarios for lifeguards) and methods to make them accessible and appropriate for learners' needs and abilities (Papalexopoulou et al., 2014; Sopka et al., 2013).

These considerations are specific to emergency medical dispatchers.

- Emergency medical dispatchers play a critical role by promptly recognizing cardiac arrest, providing CPR instructions by phone and dispatching EMS with a defibrillator. Consider as part of the education for this role:
  - the use of scripted protocols as a helpful way to confirm when a person is in cardiac arrest
  - additional training around the recognition of agonal breathing
  - how to provide CPR instructions for an adult
  - how to provide instructions for both rescue breaths and compressions if the person is a baby or child.
- Dispatchers who communicate using video-assisted emergency calls may need more training for this tool to be effective and widespread within CPR education (Bolle et al., 2008). Bang et al. (2000) suggest that dispatchers with further training (e.g. technical and emotional) are more effective.

Facilitation tips

- Emphasize that the chain of survival relies upon:

    - immediate recognition that someone is unresponsive and breathing abnormally
    - early access to help and EMS
    - early high-quality CPR (compression-only or standard CPR)
    - early defibrillation with an automated external defibrillator.
- Emphasize the importance of the first aid provider, other bystanders and EMS working together to provide quick and effective care.
- Help learners understand the desired outcomes of CPR: to pump blood around the body (chest compressions) and get oxygen into the lungs (rescue breaths). This keeps the vital organs like the brain alive until defibrillation can take place.
- Define proper compression rate and depth and highlight that the unresponsive person will have the best chance of recovery if chest compressions are of good quality.
- Emphasize that the person should be lying flat on a firm surface if possible.
- Emphasize that starting CPR early has a significant impact on the likelihood of achieving the return of spontaneous circulation for some people experiencing cardiac arrest. However, overall, the likelihood of return of spontaneous circulation remains low.
- Ensure learners understand the fundamental components of standard CPR before being taught compression-only CPR (Lam et al., 2007).

Facilitation tools

- Massive multiplayer virtual worlds allow learners to play a role and experience "real-life" scenarios and environments in which to practise their CPR skills. If implementing this tool, ensure facilitators understand how to use it and that the technology is not too complex (Creutzfeldt et al., 2013).
- If video-assisted dispatcher support is used in your country, explain how this might work so that learners are prepared to use it. Use role play to help learners to understand what happens when they call an emergency number (Bolle et al., 2008, 2010).
- If mannequins are unavailable, old car tyres can be used to practise CPR compressions. Dig the tyre about two-thirds of the way into the ground to simulate a chest, which will recoil when pushed on.
- For learners who train regularly and are knowledgeable in CPR, extend skills training to include performing CPR in different settings and situations (e.g. in noisy or distracting environments, with anxious relatives present, in crowds or small spaces with restricted access). Such training exercises encourage team-based approaches and lateral thinking.
- Use film clips or demonstrations to improve learners' recognition of abnormal breathing including agonal breathing and someone who is not breathing.

Learning connections

- In contexts where a defibrillator is likely to be available, pair this topic with unresponsive and abnormal breathing when a defibrillator is available.
- Ensure learners also understand how to maintain an open airway if someone is unresponsive and breathing normally.
- The most common condition to result in a person becoming unresponsive with abnormal breathing is a heart attack.
- Conditions that may influence whether rescue breaths could be beneficial include opioid overdose, drowning, choking or remote situations.

- Consider different learning methods, such as the use of feedback devices for education, peer learning, or video learning with a mannequin.
- Consider other topics such as acute grief and traumatic event if appropriate to the learners.

Scientific foundation

Prompt recognition of cardiac arrest

In 2010, the International Liaison Committee on Resuscitation (ILCOR) conducted an evidence summary on the recognition of cardiac arrest (Berg et al, 2010; Koster et al., 2010). In this context, recognition of cardiac arrest includes checking the pulse and recognizing agonal breathing.

To date, there are no studies that assess the accuracy of checking the pulse to detect cardiac arrest. Additionally, first aid providers often struggle to master the pulse check and recall the proper technique for performing it.

There is often a high frequency of agonal gasps after cardiac arrest, but several studies showed that first aid providers and EMS dispatchers often do not recognize them. There are many terms used to describe abnormal breathing, which can be confusing for first aid providers and dispatchers alike. Sometimes these terms are limited due to cultural influences and translation limitations, even in the same country. Teaching people to identify agonal breathing using a video clip improved the accuracy of recognizing cardiac arrest.

Evidence shows that with EMS dispatchers, failure to recognize cardiac arrest may be associated with a failure to follow cardiac arrest protocols while on the call. In a seizure complaint question sequence used by dispatchers, the detection of cardiac arrest cases improved after introducing the question, “Is he breathing regularly?” Special courses aimed at teaching dispatchers to identify agonal breathing also increased their ability to recognize cardiac arrest.

Chest compression-only CPR versus standard CPR

Numerous studies have been conducted to compare the effectiveness of chest compression-only CPR and standard CPR performed by lay rescuers, both with and without dispatcher instruction and performed by emergency medical technicians (EMT).

Compression-only CPR versus standard CPR

For this topic, we utilized two systematic reviews: one conducted by ILCOR (Olaveengen et al., 2017a; Olasveengen et al., 2017b) and another by Cochrane (Zhan et al., 2017), along with the Adult Basic Life Support: 2020 International Consensus on CPR from ILCOR (Olasveengen et al., 2020a; Olasveengen et al., 2020b).

For the critical outcome of survival with favourable neurological function, a meta-analysis of two cohort studies found no significant difference between individuals receiving compression-only CPR and those receiving CPR with a compression-to-rescue-breath ratio of 15:2. Similarly, a separate meta-analysis of three studies evaluating CPR with a compression-to-rescue-breath rate of 30:2 also demonstrated no significant difference in this outcome.

For the critical outcome of survival only, a meta-analysis of six studies showed no significant differences in survival rates between compression-only CPR and standard CPR with a 15:2 ratio. However, one study reported poorer survival rates for compression-only CPR compared to

standard CPR using a 30:2 ratio. In contrast, a meta-analysis of three observational studies revealed no significant difference between compression-only CPR and standard CPR with a 30:2 ratio.

For the important outcome of return of spontaneous circulation, a meta-analysis of three cohort studies indicated no benefit in using a 15:2 compression-to-rescue-breath ratio over other ratios.

The Cochrane systematic review specifically compared chest-compression-only-CPR versus standard CPR on non-asphyxial out-of-hospital cardiac arrest. The meta-analysis provided high-quality evidence that continuous chest compression CPR without rescue breathing improved survival to hospital discharge compared to interrupted chest compressions with pauses for rescue breathing (ratio 15:2).

Since 2020, evidence updates conducted by the ILCOR Basic Life Support (BLS) group have identified only mannequin and training studies, which have not altered the conclusions of earlier reviews.

Compression-only CPR versus standard CPR (adolescent and adults): Dispatcher-assisted

For this topic, we referenced the 2017 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations Summary (Olaveengen et al., 2017a; Olasveengen et al., 2017b).

Low-quality evidence from a randomized controlled trial indicated no significant improvement in favourable neurological outcomes when dispatchers provided instructions for continuous chest compressions compared to instructions for compressions combined with rescue breaths at a ratio of 15:2. Conversely, three randomized controlled trials comparing these two types of dispatcher-assisted CPR found that compression-only CPR offered a modest benefit in improving survival to hospital discharge.

In Japan, the nationwide recommendation of compression-only CPR for first aid providers was associated with higher rates of bystander CPR when dispatcher assistance was provided. However, outcomes for individuals receiving CPR were more favourable when bystanders performed standard CPR, including rescue breaths, compared to compression-only CPR.

Compression-only CPR versus standard CPR (adolescent and adults): Emergency medical services

This discussion references the 2017 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations Summary (Olaveengen et al., 2017a; Olasveengen et al., 2017b), three evidence updates from the ILCOR BLS Task Force in 2021, 2022 and 2023 (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b) and a systematic review conducted by the ILCOR BLS Task Force for the 2025 ILCOR guidelines (Nehme et al., 2024).

High-quality CPR prioritizes minimal interruptions to chest compressions. EMS utilize three primary techniques to deliver continuous chest compression CPR during out-of-hospital cardiac arrest (OHCA):

1. Continuous chest compressions with positive-pressure ventilation (PPV) using a bag-mask device, typically administered at a rate of 10 breaths per minute.
2. Continuous chest compressions with PPV via a tracheal tube or supraglottic airway.
3. Continuous chest compressions with passive oxygenation, generally with an oropharyngeal airway and simple oxygen mask (commonly referred to as minimally interrupted cardiac resuscitation).

These approaches often delay advanced airway placement until after the return of spontaneous circulation (ROSC) or completion of three CPR cycles.

Favourable neurological outcomes:

- A randomized controlled trial (RCT) found no significant improvement in neurological outcomes when PPV via bag-mask device was delivered without pausing compressions, compared to conventional CPR with a 30:2 compression-to-ventilation (CV) ratio.
- Observational data showed that continuous chest compressions with passive ventilation for three cycles improved neurological outcomes compared to compressions with ventilation during the transition from a 15:2 to 30:2 CV ratio.
- A cohort study reported no advantage in neurological outcomes for minimally interrupted cardiac resuscitation (three cycles of 200 uninterrupted chest compressions with passive ventilation and rhythm analysis/shock) compared to conventional CPR using a mix of 15:2 and 30:2 CV ratios in patients with witnessed shockable cardiac arrest.

Survival outcomes:

- A high-quality RCT found no significant difference in survival to hospital discharge between patients receiving continuous chest compressions and those receiving conventional CPR with a 30:2 CV ratio.
- A very-low-quality cohort study indicated improved survival in 18 patients with witnessed shockable cardiac arrest who received minimally interrupted cardiac resuscitation compared to conventional CPR with mixed CV ratios (30:2 and 15:2).
- A large cohort study involving 26,810 OHCA patients showed an association between continuous chest compressions (CCC) and improved survival to discharge compared to standard CPR. However, adherence to the randomized strategies was inconsistent. Further analysis revealed that patients who adhered to the intended CCC strategy had significantly lower survival rates, whereas those following the 30:2 strategy showed higher survival.

Return of spontaneous circulation (ROSC):

- A moderate-certainty RCT found no significant difference in ROSC rates between patients randomized to CCC and those receiving conventional CPR with a 30:2 CV ratio.
- A cohort study demonstrated that minimally interrupted cardiac resuscitation was not associated with significant changes in ROSC compared to conventional CPR.

First aid provider fatigue in chest-compression-only CPR

A comparison of first aid provider fatigue in chest compression between first aid providers who perform compression-only CPR versus standard CPR has been the subject of a scoping review for the 2020 Adult Basic Life Support 2020 International Consensus on Cardiopulmonary

Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (Olaveengen et al., 2020a; Olasveengen et al., 2020b)

Fifteen mannequin studies assessed rescuer fatigue and its impact on CPR quality across different compression-to-ventilation ratios. The findings suggest that continuous compressions maintain effective depth and frequency for the first two minutes but that short rest periods (pauses in compressions) reduce fatigue and improve CPR quality.

The 2022 and 2023 evidence updates did not identify any new clinical or simulation studies.

Chest compression quality

Hand position during compression

The recommendations for hand placement during chest compressions, initially based on low- or very low-certainty evidence in 2015, have undergone annual reviews since 2020. To date, no studies have reported on critical outcomes such as favourable neurological recovery, survival or return of spontaneous circulation (ROSC).

For the important outcome of physiological endpoints, three studies of very low certainty were identified. One crossover study involving 17 adults undergoing prolonged resuscitation for non-traumatic cardiac arrest reported improved peak arterial pressure during compression systole and end-tidal carbon dioxide (ETCO2) levels when compressions were performed on the middle of the sternum compared to the centre of the chest. However, other physiological endpoints, including arterial pressure during compression recoil, peak right atrial pressure and coronary perfusion, showed no significant differences in this study.

A second crossover study involving 30 adults in cardiac arrest found no significant differences in ETCO2 levels associated with variations in hand placement. A third crossover study, conducted on 10 children, reported higher peak systolic pressure and mean arterial blood pressure when compressions were performed on the lower third of the sternum compared to the middle of the sternum.

Chest compression components (rate, depth, chest wall recoil)

The scientific basis for chest compression components—rate, depth and chest wall recoil—is grounded in the 2020 International Consensus on Cardiopulmonary Resuscitation (CPR) from ILCOR (Olasveengen et al., 2020a; Olasveengen et al., 2020b) and subsequent ILCOR evidence updates in 2022 and 2023 (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b). Since 2015, a total of 30 studies have been included in systematic reviews and evidence updates. Seven observational studies examined both chest compression rate and depth, but none assessed chest wall recoil. Research specifically addressing chest compression rate included one randomized controlled trial (RCT), one crossover trial, and six observational studies. Studies on chest compression depth comprised one RCT and twelve observational studies, while six observational studies focused solely on chest wall recoil.

For chest compression rate, findings showed an inconsistent association with survival and favourable neurological outcomes. No significant differences were observed between various chest compression rates for one-month survival, one-day survival or hospital admission while alive. Among studies evaluating the return of spontaneous circulation (ROSC), one study

reported that a chest compression rate of 121–140/min, compared to the reference rate of 100–120/min, was associated with an increased likelihood of ROSC. However, no studies demonstrated a significant relationship between chest compression rate and either systolic or diastolic blood pressure. The recommendation is 100-120/min.

Studies on chest compression depth have yielded mixed findings regarding its impact on clinical outcomes. Increased chest compression depth has been associated with higher odds of hospital admission, while other studies found no significant relationship between varying mean compression depths and survival to hospital admission.

Favourable neurological outcomes appear largely unaffected by the depth of chest compression. However, one study suggested that a compression depth of greater than five cm in adults improved survival and neurological outcomes compared to other depths during standard CPR. Regarding survival, several studies reported significant associations between chest compression depth and one-day survival in adults. Specifically, one study indicated that mean compression depths of five to six cm resulted in the highest rates of survival to emergency department admission. Another study found that survival to hospital discharge decreased when chest compression depth was less than 38 mm compared to depths exceeding 51 mm. However, deeper chest compressions were associated with an increased risk of injuries. The mean compression depth among individuals who sustained injuries was 56 mm, compared to 52 mm in those without injuries.

Regarding chest wall recoil, no significant association has been observed between variations in chest compression release speed and survival to hospital discharge. One study examining the return of spontaneous circulation (ROSC) found no statistically significant improvement with a 10 mm/s increase in release speed. Evidence from animal studies, however, suggests that incomplete chest recoil may lead to reduced coronary perfusion pressure.

This scientific review underscores substantial gaps in the research evidence concerning chest compression components. Most studies focused on individual components, while several highlighted potential confounding interactions, emphasizing the need for caution when assessing any single component in isolation. Importantly, no studies provided sufficient new evidence to warrant a revision of the 2015 or 2020 resuscitation guidelines.

Check for circulation during basic life support

There is no new evidence to justify changing the 2015 and 2020 treatment recommendation (Travers et al., 2015; Perkins et al., 2015; Olasveengen et al., 2020a; Olasveengen et al., 2020b) outside of the ALS environment where invasive monitoring is available. There are insufficient data on the value of a pulse check during CPR. Some relevant articles showing the effectiveness of ultrasound in checking for circulation were identified. We therefore do not make a guideline on the value of a pulse check.

Firm surface for CPR

This discussion references the Adult Basic Life Support (ALS) guidelines from the 2020 International Consensus on CPR (Olasveengen et al., 2020a; Olasveengen et al., 2020b) and a 2024 systematic review from ILCOR (Dewan et al., 2024). Since 2020, one small observational study and six additional randomized controlled trials (RCTs) conducted on mannequins have been identified.

It is important to note that no clinical studies have reported on the critical outcomes of survival or favourable neurological outcomes, nor on the important outcome of chest compression quality for this topic. Meta-analysis results from the mannequin simulation studies evaluated CPR metrics such as compression rate and depth when comparing various surfaces: backboard versus hospital mattress, floor versus hospital mattress, or floor versus firm home mattress and other surfaces. These analyses revealed no significant effects or results.

While current guidance suggests performing chest compressions on a firm surface when practical and without significant delays to their initiation, it is not recommended to move a patient from a firm mattress to the floor solely to improve compression depth. Research has also shown that effective compression depths can be achieved on softer surfaces if the CPR provider compensates by increasing the overall compression depth to account for mattress compression.

Harm caused by CPR to a person who is not in cardiac arrest

Harm caused by CPR to a person who is not in cardiac arrest

Many first aid providers are concerned that they will harm a person who is not in cardiac arrest or cause severe complications by giving chest compressions. This belief makes them reluctant to start CPR. The intention of this recommendation is to strongly encourage and support lay rescuers who are willing to initiate CPR in any setting when they believe someone is in cardiac arrest.

For this topic, we use the Adult Basic Life Support, 2020 International Consensus on CPR from ILCOR (Olasveengen et al., 2020a; Olasveengen et al., 2020b), and the systematic review that supports the new treatment recommendation published in 2025 from the ILCOR First Aid Task Force (Djärv et al., 2025a; Djärv et al., 2025b).

The systematic review conducted in 2019 and published on the ILCOR website (Svavarsdottir et al., 2019) included four observational studies that looked at 762 people who were not in cardiac arrest but still received CPR by first aid providers outside the hospital. Pooled data from three of these studies found an incidence of muscle damage of 0.3%, bone fractures (rib and clavicle) of 1.7%, pain in the area of chest compression of 8.7% and no visceral injuries. The fourth study reported no injury. In the new systematic review (Williamson et al., 2024), pooled data from the five included studies on 1,031 patients showed a frequency of less than 1% of harm/complication or risk of complications.

This recommendation placed a much higher value on the potential survival benefits of CPR initiated by a first aid provider for patients in cardiac arrest, and a lower value on the low risk of injury in patients not in cardiac arrest.

Harm to the rescuer from CPR

This topic was initially examined in a 2009 scoping review by Semeraro et al. as part of the 2010 ILCOR International Consensus on CPR and Treatment Recommendations (Berg et al., 2010; Koster et al., 2010). The review focused on injuries caused by CPR in individuals not experiencing cardiac arrest and evaluated potential risks to first aid providers, including harm from chest compressions, rescue breaths and defibrillator use. Subsequent ILCOR updates in 2021, 2022 and 2023 identified three new studies (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b):

- One study reported a low risk of physical injury among volunteer citizen responders dispatched to out-of-hospital cardiac arrests (OHCA).
- Another study noted slightly increased pain with two-handed CPR compared to one-handed CPR in paediatric cases.
- A third study found a low risk of harm to rescuers wearing polyethylene gloves during defibrillation.

In summary, the limited reports of adverse effects, despite the widespread and frequent use of CPR and defibrillation in basic life support, suggest that these interventions are relatively safe. The incidence and severity of defibrillator-related injuries to first aid providers remain low.

CPR before calling for help

For this topic, we used the Adult Basic Life Support, 2020 International Consensus on CPR from ILCOR (Olasveengen et al., 2020a; Olasveengen et al., 2020b). Since its publication, three evidence updates from ILCOR in 2021, 2022 and 2023 have not identified new evidence necessitating changes to these guidelines (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b). The optimal sequence for calling for help and starting CPR frequently arises during CPR education and was the subject of a new question and recommendation in 2020. Increased availability of phones and hands-free options for lone first aid providers was considered important.

For the critical outcome of survival with a favourable neurological outcome, only one observational study is identified, and no meta-analysis is available. This cohort study, conducted in Japan, found no overall benefit of a “CPR-first” strategy compared to a “call-first” strategy. However, adjusted subgroup analyses suggested significant improvements in survival with favourable neurological outcomes when a "CPR-first" strategy was used in specific contexts, including: non-cardiac etiology out-of-hospital cardiac arrest, individuals under 65 years of age, individuals under 20 years of age and cases combining non-cardiac etiology and age under 65. The certainty of the evidence was rated as very low, and the findings are not generalizable to all OHCAs. The study specifically addressed cases where bystanders witnessed the event and initiated CPR spontaneously after a brief delay.

Starting CPR: Rescue breaths or compression

The scientific foundation for this topic is based on a systematic review conducted in 2019 (Considine, et al. 2019) as part of the ILCOR 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Olasveengen et al., 2020a; Olasveengen et al., 2020b). This foundation was further strengthened by an updated systematic review completed in 2024 (Bray et al., 2025a; Bray et al., 2025b). While no human studies were identified in either review, the 2024 update included one new paediatric mannequin simulation study, supplementing the four mannequin simulation studies from previous ILCOR reviews. These prior studies consisted of three randomized controlled trials (one in adults, two in paediatrics) and two observational studies in adults. For the important outcomes, we identified five simulation studies, but as the observational studies and randomized controlled trials were all at high risk of bias due to lack of blinding and a high degree of heterogeneity, no meta-analyses could be performed, and individual studies are difficult to interpret.

Summary of key outcomes:
Time to commencement of chest compressions: All identified mannequin simulation studies found that the C-A-B (compression, airway, breathing) sequence significantly reduced the time to starting chest compressions compared to the A-B-C sequence.

Time to commencement of rescue breaths: Two randomized mannequin studies were reviewed.

In cardiac arrest scenarios, the mean time to initiating ventilations was significantly longer with the C-A-B sequence. In respiratory arrest scenarios, ventilations began significantly earlier with the C-A-B sequence.

Time to completion of the first CPR cycle (30 chest compressions and two rescue breaths): One randomized mannequin study showed that the mean time to complete the first resuscitation cycle (30:2) was shorter with the C-A-B sequence. The clinical significance of this finding remains unclear.

Ventilation rate: A cross-over paediatric randomized mannequin study demonstrated that the median number of ventilations delivered within the first minute was significantly higher with the A-B-C sequence.

Compression rate: One paediatric randomized mannequin study and one adult observational study found no significant difference in compression rates between the C-A-B and A-B-C sequences.

Chest compression fraction (CCF): Two studies (one paediatric randomized and one adult observational) analysed CCF. The paediatric randomized study showed a significantly lower median CCF with the A-B-C sequence (due to delivering five rescue breaths before starting chest compressions) whereas the adult observational study, however, reported no difference in CCF between the two sequences.

Minute alveolar ventilation in the first minute of resuscitation: A paediatric randomized mannequin study found that the A-B-C sequence resulted in higher alveolar ventilation during the first minute of resuscitation, attributed to the delivery of five rescue breaths before commencing chest compressions.

Compression-to-rescue-breath ratio

In 2017, ILCOR completed an evidence summary on the optimal compression-to-rescue-breath ratio during CPR, providing a critical component of the scientific foundation for resuscitation guidelines (Olaveengen et al., 2017a; Olasveengen et al., 2017b). Additionally, a new systematic review conducted by the ILCOR BLS Task Force in 2024 will contribute to the 2025 ILCOR treatment recommendations, further strengthening this scientific foundation (Nehme, 2024, ILCOR website).

Favourable neurological survival at discharge or 30 days
Two very low-certainty cohort studies were identified:

- In a cohort study involving 3,960 out-of-hospital cardiac arrest (OHCA) cases with initially non-shockable rhythms, the implementation of the 2005 resuscitation guidelines, which included a compression-to-ventilation (CV) ratio of 30:2, was associated with improved

neurologically favourable survival at hospital discharge compared to an earlier period using a CV ratio of 15:2.

- In another cohort study of 522 OHCA cases with initially shockable rhythms, treatment under the 2005 guidelines with a CV ratio of 30:2 showed no significant change in neurologically favourable survival at 30 days compared to treatment under the 2000 guidelines with a CV ratio of 15:2.

Survival to hospital discharge or 30-day survival

Six very low-certainty evidence sources were identified, summarized as follows:

CV ratio 30:2 vs. 15:2

Five retrospective before-and-after studies examined the implementation of the 2005 resuscitation guidelines, which included a CV ratio of 30:2.

- Among OHCA patients of all rhythms, two cohort studies reported improved risk-adjusted odds of survival with a CV ratio of 30:2 compared to 15:2, while one study found no significant difference.
- For OHCA patients with initially shockable rhythms, one study observed improved survival to hospital discharge with a CV ratio of 30:2 compared to 15:2, but the effect was completely attenuated after adjusting for temporal trends.
- For OHCA patients with initially non-shockable rhythms, one study reported increased survival with a CV ratio of 30:2, while another study found no difference.

CV ratio 50:2 vs. 5:1

A before-and-after study of 200 bystander-witnessed OHCA cases with initially shockable rhythms reported improved survival to hospital discharge after implementing a bundled resuscitation protocol that included a CV ratio of 50:2 compared to 5:1.

Survival to 12 months

One very low-certainty cohort study involving 3,960 OHCA patients with initially non-shockable rhythms reported improved 12-month survival with a CV ratio of 30:2 compared to 15:2.

Return of spontaneous circulation (ROSC)

A very low-certainty cohort study of 1,243 OHCA patients reported no significant change in the risk-adjusted odds of ROSC with a CV ratio of 30:2 compared to 15:2.

Reducing pauses between chest compressions

For this topic, we utilized an evidence summary from ILCOR published in 2015 (Perkins et al., 2015) and a systematic review conducted for the 2022 ILCOR Consensus on Science with Treatment Recommendations (CoSTR) (Olaveengen et al., 2022a; Olasveengen et al., 2022b). The identified evidence was categorized into five key themes:

Interventions affecting CPR quality

- New AED strategies (e.g. different levels of energy or different waveforms): The implementation of advanced AED strategies increased CPR fractions and reduced both pre-shock and post-shock pauses. However, these improvements did not translate into changes in overall survival rates.

- Chest compression strategy: This approach resulted in higher CPR fractions but was associated with lower survival to hospital admission, with no notable difference in survival to discharge.

CPR fraction over time and across systems

- From 2006 to 2016, incremental enhancements in CPR quality metrics contributed to increased CPR fractions and a higher proportion of survivors with favourable outcomes.

Chest compression pauses and outcomes

- CPR fractions and survival: Higher CPR fractions were associated with improved survival and return of spontaneous circulation (ROSC).
- Duration of CPR: For resuscitation lasting over 20 minutes, CPR fractions exceeding 80% were linked to better neurological outcomes and higher survival to discharge compared to fractions below 80%. However, for shorter CPR durations of five or ten minutes, no significant differences in survival were observed.
- Variable survival trends: Lower CPR fractions (<40%) were sometimes linked to higher survival to discharge compared to higher fractions (>80%). Conversely, higher survival rates were observed with CPR fractions between 60–79% compared to fractions below 60%.

Preshock and perishock pauses

Shorter pre-shock pauses (<10 seconds) and peri-shock pauses (<20 seconds) were associated with higher survival rates compared to longer pauses. However, no additional survival advantage was observed when peri-shock pauses shorter than 10 seconds were compared to those longer than 10 seconds.

CPR pauses in survivors vs. non-survivors

- Early CPR fractions: Non-survivors showed higher CPR fractions during the initial five minutes of resuscitation.
- Patient outcomes and ROSC: Patients with downtimes exceeding 15 minutes without ROSC exhibited higher CPR fractions, while those who achieved ROSC also demonstrated elevated CPR fractions.

This evidence highlights the intricate relationship between CPR quality metrics and patient outcomes, underscoring the importance of tailoring resuscitation strategies to optimize results. Notably, high-quality CPR remains critical to improving patient outcomes. Key components of high-quality CPR include achieving 100-120 chest compression rate and minimizing peri-shock pauses.

Rhythm-check timing

This topic is grounded in scientific evidence, including the ILCOR treatment recommendation by Ristagno et al. (2019) and the 2020 ILCOR International Consensus on CPR for Adult Basic Life Support (Olasveegen et al., 2017). Evidence updates conducted in 2021, 2022 and 2023 did not identify any new studies that would alter these conclusions (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b).

A correlation exists between interruption in chest compressions and adverse outcomes. One of the most frequent disruptions occurs during rhythm checks following defibrillation. However, any unnecessary pauses in chest compressions may negatively affect cardiac arrest outcomes.

Survival with favourable neurological outcome at discharge
For this outcome, one randomized controlled trial (RCT) and three observational studies were reviewed. Both the RCT, which included 415 out-of-hospital cardiac arrests (OHCAs), and the studies, which involved 763 OHCAs, assessed the impact of interrupting chest compressions to check the rhythm immediately after shock delivery. The RCT demonstrated no benefit to this interruption, whereas the observational studies indicated harmful effects.

Survival to hospital discharge
Evidence regarding survival to hospital discharge included two RCTs with 1,260 OHCAs and three observational studies with 3,094 OHCAs. The RCTs showed no benefit to interrupting chest compressions for rhythm checks after defibrillation. In contrast, the observational studies revealed harmful effects associated with such interruptions.

Survival to hospital admission
For survival to hospital admission, two RCTs involving 1,260 OHCAs found no benefit to rhythm checks immediately after defibrillation.

Return of spontaneous circulation (ROSC)
Regarding ROSC, two observational studies encompassing 2,969 OHCAs reported harmful effects when chest compressions were interrupted following shock delivery. Additionally, three RCTs investigating the impact of chest compression fraction, involving 1,412 OHCAs, also demonstrated harmful effects associated with interruptions for rhythm checks.

In summary, the evidence consistently highlights the detrimental impact of interrupting chest compressions to perform rhythm checks immediately after defibrillation. These findings underscore the importance of minimizing pauses in chest compressions to optimize outcomes in cardiac arrest management.

Dispatch diagnosis of cardiac arrest

This topic draws on the 2020 ILCOR International Consensus on CPR for Adult Basic Life Support (Olaveengen et al., 2020a; Olasveengen et al., 2020b). and the 2019 ILCOR systematic review of dispatch diagnosis of cardiac arrest (Drennan et al., 2019). These sources evaluate the effectiveness of dispatch algorithms and criteria in identifying out-of-hospital cardiac arrests (OHCAs) to ensure accurate emergency responder triage. Key findings include:

- Sensitivity: Dispatchers correctly identified cardiac arrest in 79% of cases (range: 69%–83%) across 46 studies involving 84,534 OHCAs.
- False negatives: Dispatchers missed cardiac arrest diagnoses in 21% of cases (range: 17%–32%).
- Specificity: Dispatchers correctly identified the absence of cardiac arrest in 99% of cases (range: 93%–100%) based on 12 studies with 789,004 OHCAs.
- False positives: Dispatchers misidentified cardiac arrest in 1% of cases (range: 1%–7%) when it was not present.

These findings underscore the strengths and challenges of dispatch centres in identifying life-threatening cardiac events.

Following evidence updates in 2021 and 2022, which identified one new randomized controlled trial (RCT) and six observational studies, the ILCOR Basic Life Support Task Force conducted a scoping review in 2023 (Malta Hansen 2023, ILCOR website). This review explored strategies to optimize dispatcher-assisted (DA) recognition of OHCA and included 60 studies categorized into four major areas:

1. Communication: Interaction between caller and dispatcher.
2. Technology: New tools to enhance OHCA recognition.
3. Patient characteristics: Symptoms and traits associated with OHCA.
4. Quality improvement: Implementation of protocols in emergency dispatch centres to enhance recognition.

Most studies were retrospective and observational, focusing on the proportion of OHCAs recognized by dispatchers and factors influencing recognition.

Key challenges and strategies

The primary challenge in dispatcher-assisted OHCA recognition is determining whether the patient is breathing normally. Various strategies were explored:

- Bypassing the breathing assessment in the initial evaluation.
- Asking callers to place their hand on the patient's stomach.

However, none outperformed the widely used "two-questions" strategy. No RCTs compared different strategies directly.

Role of artificial intelligence (AI)

The only RCT examined the integration of an AI model to improve OHCA recognition. While the AI model performed well, it did not improve telecommunicator recognition due to high false-positive rates.

In conclusion, the scoping review found no new evidence to warrant changes in current treatment recommendations.

Dispatcher-assisted CPR

This topic is informed by a systematic review published in 2019 (Nikolaou et al., 2019) for ILCOR Adult Basic Life Support, the 2020 International Consensus on CPR (Olasveengen et al., 2020a; Olasveengen et al., 2020b), and an ongoing systematic review by the ILCOR BLS Task Force for the 2025 ILCOR treatment recommendations (Cash 2024 ILCOR website).

Four randomized controlled trials (RCTs) and six observational studies compared dispatcher-assisted compression-only CPR (CCO-CPR) with conventional CPR (C-CPR) performed at ratios of 15:2 and/or 30:2. The comparisons included adult populations and all age groups, with or without bystander CPR ongoing at the time of the emergency call. The overall quality of evidence for all outcomes was rated as low to very low.

Favourable neurological outcome

One RCT and three observational studies were identified.

- Two cohort studies assessing combined bystander and dispatcher-assisted CPR suggested improved neurological outcomes with CCO-CPR compared to 15:2 CPR and combined 15:2/30:2 CPR.
- The remaining three studies, including the RCT, found no significant difference between CCO-CPR and either 15:2 or 30:2 CPR for survival with favourable neurological outcomes.

Survival to hospital discharge or 30-day survival
Two RCTs and five cohort studies were included.

- One large observational study of 143,500 presumed medical-origin OHCA cases across all age groups reported significantly higher odds of 30-day survival with CCO-CPR compared to C-CPR at ratios of 15:2 or 30:2.
- Two additional observational studies (one involving 5,406 all-age OHCAs and another involving 24,947 adult bystander-witnessed OHCAs) found significantly lower odds of survival to hospital discharge for CCO-CPR compared to C-CPR at 15:2 and 30:2, and lower odds of 30-day survival for CCO-CPR compared to 30:2 CPR.
- The remaining two RCTs and two observational studies found no significant differences in survival to hospital discharge or 30-day survival between CCO-CPR and C-CPR.

Survival to hospital admission

Four RCTs were identified.

- Three studies focused on adult patients, with two comparing CCO-CPR to 15:2 CPR and one comparing CCO-CPR to 30:2 CPR.
- The fourth RCT included all age groups and compared CCO-CPR to 15:2 CPR.

None of the studies reported significant differences in survival to hospital admission between the CPR strategies.

Return of spontaneous circulation (ROSC)

One cohort study was identified. This study of 143,500 presumed medical-origin OHCA cases across all age groups reported no significant difference in ROSC between CCO-CPR and C-CPR at ratios of 15:2 or 30:2.

Feedback for CPR quality

This topic is informed by the ILCOR 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (Olaveengen et al., 2020a; Olasveengen et al., 2020b) and one evidence update in 2021 (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

Three distinct types of real-time CPR guidance devices were identified:

1. Digital audiovisual feedback: Devices providing corrective audio prompts.
2. Analogue audio and tactile feedback: Includes a “clicker” mechanism that provides tactile and auditory feedback for chest compression depth and release.
3. Metronome guidance: Facilitates maintaining an appropriate chest compression rate.

The analogue "clicker" device is specifically designed to be placed on the patient's chest beneath the hands of the CPR provider. It emits a "click" sound and sensation when adequate pressure is applied during compressions. Due to substantial clinical heterogeneity among studies—including variations in device type, mechanisms of CPR quality measurement, feedback modalities, patient populations, settings (e.g. in-hospital versus out-of-hospital) and baseline CPR quality—conducting a meta-analysis was not feasible. The majority of higher-certainty data from key studies did not show a clinically or statistically significant association between the use of real-time feedback devices and improved patient outcomes. Furthermore, implementing these devices requires additional resources for procurement and training.

However, some studies did report clinically meaningful improvements associated with feedback device usage. Notably, a randomized controlled trial (RCT) involving 900 patients with in-hospital cardiac arrest (IHCA) in Iran was conducted. This study demonstrated a significant increase in survival to hospital discharge with the use of an analogue "clicker" device, which provides real-time feedback on compression depth and recoil. Nevertheless, this study was an outlier, and its findings should be interpreted with caution. Further research is needed to provide specific recommendations regarding the type of real-time feedback devices that could enhance CPR quality and patient outcomes.

Alternative compression techniques (cough CPR, precordial thump, fist pacing)

Cough CPR

The evidence regarding the effectiveness of cough CPR is limited to observational studies with very low certainty. While cough CPR has shown potential in specific cases to maintain consciousness and facilitate survival during arrhythmic events, the evidence is sparse, heterogeneous, and of very low certainty. Further rigorous research is needed to establish its efficacy and broader applicability.

Precordial thump evidence

The evidence on the effectiveness of the precordial thump in resuscitation is derived solely from observational studies with very low certainty of evidence. This limits the interpretability of findings, and no meta-analysis was feasible. In summary, the precordial thump may be effective in specific cases, particularly for ventricular tachycardia (VT) termination or achieving ROSC. However, its impact on survival to hospital discharge is unclear, with inconsistent results and limited applicability to ventricular fibrillation (VF) cases. Further high-quality research to establish its efficacy and appropriate use is necessary.

Fist pacing evidence

The evidence on fist pacing is based on observational studies with very low certainty of evidence. The limited data make it challenging to draw definitive conclusions, and no meta-analysis was performed. Fist pacing shows potential for temporary stabilization in cases of asystole or severe bradycardia, with initial responses observed in most patients. However, survival rates and long-term outcomes remain uncertain due to methodological limitations, small sample sizes, and inconsistent reporting. Further high-quality studies are necessary to determine its clinical effectiveness.

Video-based dispatch system

This topic is informed by a systematic review conducted by the ILCOR BLS Task Force for the 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Wyckoff et al., 2021; Wyckoff et al., 2022a) and two evidence updates in 2022 and 2023 (Wyckoff et al., 2022b; Wyckoff et al., 2022c; Berg et al., 2023a; Berg et al., 2023b).

Observational studies of adult out-of-hospital cardiac arrests assessed the impact of video-based dispatch compared to audio-based dispatch. The studies provided very-low-certainty evidence suggesting potential benefits of video-based dispatch on neurological outcomes, survival at discharge and prehospital return of spontaneous circulation (ROSC). However, these benefits were not sustained after multivariable adjustment or propensity score matching. Furthermore, mannequin simulation studies have demonstrated improved CPR quality, including compression rate and time to compression, with video-based dispatch in untrained participants; however, these studies have also shown longer times (e.g. to recognition, first compression). However, no significant differences were observed in other CPR quality measures.

The ILCOR guidelines recommend evaluating the effectiveness of video-based dispatch systems through clinical trials or research initiatives.

Head-up CPR

Head-up CPR has been proposed as an alternative cardiopulmonary resuscitation (CPR) technique with the potential to enhance cerebral perfusion by facilitating improved venous return from the brain. This analysis draws upon a systematic review published on the ILCOR website for the 2021 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Wyckoff et al. 2021; Wyckoff et al., 2022a), supplemented by an updated review incorporating new evidence currently under preparation (Norii et al., 2024). The systematic review identified three observational studies from a single research initiative, with no randomized controlled trials (RCTs) included.

For the critical outcomes of survival to hospital discharge and survival with favourable neurological outcomes, the evidence suggests a potential survival advantage with head-up CPR for patients with nonshockable rhythms. However, results regarding neurological outcomes and broader populations remain inconsistent due to very low-certainty evidence and the inherent risk of bias.

In terms of return of spontaneous circulation (ROSC), findings varied among the three studies. The study by Pepe reported a significant increase in ROSC rates with head-up CPR. In contrast, the studies by Moore and Bachista did not find statistically significant differences in ROSC rates between head-up CPR and conventional CPR.

These findings underscore the need for further high-quality research, particularly RCTs, to establish the effectiveness and broader applicability of head-up CPR and while waiting for new scientific evidence, head-up CPR during CPR should not be routinely used.

Cardiopulmonary resuscitation in obese patients

Given the increasing global prevalence of obesity, the ILCOR conducted a scoping review to evaluate the current evidence on the treatment and outcomes of obese patients (adults and

children) experiencing cardiac arrest (Considine, 2024, 188). In adults, the findings regarding neurological outcomes, survival to hospital discharge, long-term survival (months to years) and return of spontaneous circulation (ROSC) were inconsistent. Among children, two studies indicated that obesity was associated with worse neurological outcomes, lower survival rates and reduced ROSC compared to their normal-weight counterparts. The review also revealed a lack of studies addressing resuscitation quality indicators or adaptations to CPR techniques for obese patients. No studies specifically examined modifications to CPR protocols based on patient weight.

This scoping review offers a comprehensive summary of the existing literature on CPR in obese populations and underscores significant gaps in knowledge. While the variability in outcomes does not currently warrant deviations from standard CPR protocols, there is some evidence suggesting that CPR duration may be longer in obese adults, potentially affecting staffing and resource allocation.

CPR during transport

This discussion draws on the ILCOR scoping review (Smyth et al., 2020) conducted for the 2020 Consensus on Science with Treatment Recommendations (CoSTR) (Olaveengen et al., 2020a; Olasveengen et al., 2020b) and the ILCOR evidence update published in 2022 (Wyckoff et al., 2022b; Wyckoff et al., 2022c). The reviewed studies were categorized into two groups: those assessing the effect of transport with ongoing CPR on CPR quality and those examining its impact on patient outcomes, including survival. Studies focused on CPR quality during transport evaluated various metrics, including:

- Correct hand positioning, pauses, complete release and ventilation rates: Transport appears to have minimal impact on these parameters.
- Chest compression rate and depth: While appropriate rates and depths can be achieved during transport, there is greater variability compared to CPR performed at the scene.
- Chest compression fraction and overall CPR quality: Transport negatively affects both chest compression fraction and overall CPR performance, showing significant variation in these measures.

These findings highlight the challenges and variability in maintaining high-quality CPR during patient transport.

Duration of CPR cycles

Note: CPR cycle = interval between pausing chest compressions to assess the cardiac rhythm (expressed in time or number of compressions).

This topic is informed by two studies. The first study was included in the 2015 ILCOR review (Nordseth et al., 2014). The second study is a systematic review published by ILCOR in Resuscitation (J. C. Reynolds et al., 2015). Notably, the literature search did not identify any new data. Additionally, many of the studies reviewed were conducted prior to the adoption of the current 30:2 compression-to-ventilation ratio. For comparison of CPR Intervals:

Three minutes vs. one minute

The first study involved 200 adults experiencing out-of-hospital cardiac arrests. For critical outcomes, such as survival to hospital discharge with favourable neurological outcomes, survival to hospital discharge and return of spontaneous circulation (ROSC), no significant benefit was observed when comparing the following groups:

- Intervention group: Immediate defibrillation (up to three stacked shocks) for VF/VT, followed by three minutes of CPR regardless of the post-shock rhythm.
- Control group: Immediate defibrillation (up to three stacked shocks) for VF or pulseless VT, followed by one minute of CPR for refractory VF/VT, and three minutes of CPR for patients with non-shockable rhythms following initial shocks.

One minute vs. two minutes

The second study included 202 adults experiencing out-of-hospital cardiac arrests. For critical outcomes, such as survival to hospital discharge and ROSC, no significant benefit was found when comparing the following treatment protocols:

- Control group: Stacked shocks (up to three for refractory VF/VT), CPR with a 15:2 compression-to-ventilation ratio, and one-minute CPR cycles between defibrillation attempts.
- Intervention group: Single shocks, CPR with a 30:2 compression-to-ventilation ratio, and two-minute CPR cycles between defibrillation attempts.

A 2014 study (Nordseth et al., 2014) aimed to determine the optimal timing for the first rhythm check in patients presenting with pulseless electrical activity (PEA) or asystole. The study assessed the time to conversion to a shockable rhythm or ROSC. The authors suggested that the first rhythm check could be delayed until four minutes for patients presenting with PEA and six to eight minutes for those presenting with asystole. However, they did not provide an effect estimate to definitively support this recommendation. Their conclusions were based on observations that conversion from PEA/asystole to a shockable rhythm or ROSC typically required more than two minutes and that the likelihood of conversion diminished with each subsequent two-minute cycle.

In recommending chest compressions be paused every two minutes for rhythm assessment, we prioritized consistency with existing guidelines and recognized the lack of compelling evidence to justify altering CPR cycle duration. Additionally, we acknowledge the significant risks and costs associated with guideline changes. Adapting CPR protocols involves retraining educators and providers, who must implement new strategies in the context of complex and high-stress medical emergencies.

Tidal volumes and ventilation rates

This topic is informed by the Adult Basic Life Support 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Berg et al., 2010; Koster et al., 2010). No new studies have been identified on this subject since 2010.

Three human studies demonstrated that tidal volumes of 600 mL using room air were sufficient to maintain oxygenation and normocarbia in apnoeic patients. In contrast, tidal volumes below 500 mL required supplemental oxygen to achieve adequate oxygenation.

Additionally, three studies using mechanical models reported no clinically significant differences in tidal volumes when comparing inspiratory times of one second and two seconds. However, a single human study involving eight participants found that expired air resuscitation with tidal volumes of 500–600 mL resulted in hypoxia and hypercarbia.

These findings highlight the importance of delivering adequate tidal volumes during resuscitation to ensure effective oxygenation and ventilation.

Barrier devices

Adverse events resulting from the administration of CPR are rare, despite its widespread application globally. Only isolated cases have been reported, such as the transmission of tuberculosis and severe acute respiratory distress syndrome (SARS) to individuals providing CPR. Notably, there have been no documented cases of HIV transmission during CPR. To mitigate the risk of infection, responders exposed to infectious agents while performing CPR are advised to take appropriate prophylactic measures. Psychological distress has also been reported among responders in some cases.

No human studies have specifically evaluated the safety, efficacy or feasibility of using barrier devices during CPR. However, laboratory studies have demonstrated that nonwoven fibre filters and barrier devices equipped with one-way valves effectively prevent the transmission of oral bacterial flora from the victim to the rescuer during mouth-to-mouth ventilation.

Adverse effects for responders have been observed when performing mouth-to-mouth ventilation on victims of organophosphate or cyanide intoxication. Additionally, one study found that a high volume of air containing a highly virulent agent, such as the SARS coronavirus, can surpass the protective capabilities of gowns, double gloves, goggles, full-face shields and non-fit-tested N95 disposable respirators.

These findings emphasize the importance of proper precautions to minimize risks to responders during CPR, particularly in cases involving infectious agents or toxic exposures.

Mechanical CPR devices

This topic is based on a recent ILCOR systematic review (Pocock et al., 2024) that assessed the efficacy and safety of mechanical CPR devices compared to manual CPR for out-of-hospital cardiac arrest (OHCA). The included studies evaluated critical outcomes, including ROSC, survival, neurologic outcomes and adverse effects. The findings are presented below, categorized by the type of mechanical CPR devices:

Load-distributing band devices

For neurological outcomes and hospital discharge, studies demonstrated no consistent benefit from using these devices for CPR and, in some cases, slightly worse outcomes. Regarding ROSC, the results were inconsistent across studies. Additionally, no significant differences were found in resuscitation-related injuries between manual and mechanical CPR.

Piston-based devices

Regarding neurological outcomes, survival, ROSC and injury rates, the evidence did not show clear or consistent benefits of piston-based devices over time. Overall, the evidence does not support the routine use of mechanical CPR devices over manual CPR due to inconsistent benefits and low certainty. However, these devices may be appropriate in specific scenarios depending on the context and operational considerations.

Education review

We identified 59 papers through our search strategy that offer insights to support adults in learning CPR. Many of the supported insights covered elsewhere in these Guidelines concern educational approaches and learning methodologies; however, the evidence set out below highlights issues most specific to CPR.

Adaptation and prioritization

- Papalexopoulou et al. (2014) and Sopka et al. (2013) identify the need for adapting educational tools (e.g. mannequins and defibrillators), locations (e.g. waterfront scenarios for lifeguards) and methods to make them accessible and appropriate for learners' needs and abilities.
- Tweed and Wilson (1977) advocate that first aid education providers prioritize training community members most likely to encounter cardiac arrest emergencies in CPR, such as medics, police officers, firefighters and lifeguards. They suggest that these groups, given their status and role in the community, might make effective educators for the general public.
- Huang et al. (2016) identify people with family members who are at high risk of cardiac arrest due to illness as being more motivated to learn first aid.

Barriers and challenges to learning

- Some bystanders have concerns about disease exposure and transmission through standard CPR, which has caused a significant decrease in their willingness to provide it to both strangers and family members. Compression-only CPR is the preferred method (Chien et al., 2019; Jelinek et al., 2001; Lam et al., 2007; Pei-Chuan Huang et al., 2019).
- For practical CPR courses, there is limited evidence to demonstrate that female-only learner groups are beneficial to female learners; however, there is evidence to support the notion that males are more likely to learn in mixed groups (Sopka et al., 2013).

Enhanced scenario-based learning

- Massive multiplayer virtual worlds allow learners to play a role and experience "real-life" scenarios and environments in which to practise their CPR skills (Creutzfeldt et al., 2013).

Dispatcher-assisted CPR

- There is limited evidence in favour of the efficacy of dispatchers providing instructions to lay responders on how to perform CPR. Providing CPR instructions using video-assisted technology does not significantly improve the overall quality of bystander CPR compressions or rescue breaths (Bolle et al., 2008). However, in a study by Bolle et al. (2011), participants noted that video-equipped mobile phones should be utilized instead of audio-only phones

during a medical emergency. Given the fast-emerging technology associated with smartphones, we identified this as a gap in evidence that requires further exploration.

Dispatchers who communicate using video-assisted emergency calls may need more training for this tool to be effective and widespread within CPR education (Bolle et al., 2008). Bang et al. (2000) suggest that dispatchers with further training (e.g. technical and emotional) are more effective.

Unresponsive and abnormal breathing (baby and child)

Unresponsive and abnormal breathing (adolescent and adult)

Key action

Immediately start rescue breaths and chest compressions and access emergency medical services (EMS).

Introduction

If a baby or child is unresponsive with abnormal breathing (e.g. taking irregular or noisy breaths, or has stopped breathing altogether) and has no signs of life, it indicates they are in cardiac arrest. When a baby or child is in cardiac arrest, their heart stops beating and cannot pump blood around their body. This means that vital organs, such as the brain, do not get enough oxygen and can start to deteriorate within minutes. While cardiac arrest occurs less frequently in babies and children compared to adults, it is still life-threatening. Typically, cardiac arrest in babies and children is the result of a breathing problem, whereas in adults, it usually has to do with their heart itself. The causes vary by age, setting and any underlying health problems of the baby or child; however, some common ones include choking, drowning and disease. Since the cause of cardiac arrest is likely to relate to their breathing, rescue breaths play a critical role in CPR for babies or children. Survival to hospital discharge is primarily linked to the early initiation of CPR.

- The techniques of CPR need to be adapted depending on the size of the unresponsive person and the size of the first aid provider. If the person looks like a baby (less than about one year old), treat them as a baby. If the person looks like they are a child, treat them as a child.
- If the person looks like an adolescent (they may have been through puberty) or an adult, use the guidelines provided in unresponsive and abnormal breathing (adolescent and adult).
- It is most important to initiate the chain of survival behaviours.

Guidelines

- First aid providers should use a response check and breathing check to ascertain whether a baby or child is unresponsive and breathing abnormally. Checking for a pulse is not needed.*
- CPR should be performed on a baby or child who is unresponsive with abnormal breathing (e.g. taking irregular or noisy breaths or has stopped breathing altogether).**
- Lay providers should perform both rescue breaths and chest compressions for a baby or a child in cardiac arrest. If they are unable to provide rescue breaths, they should at least perform chest compressions.**
- For a baby, chest compressions can be performed with the two-thumb-encircling hand method or with the two-finger technique. In newborns, the two-thumb-encircling hand method is preferred.*

- For a child, chest compressions may be performed with one or two hands. For example, if the first aid provider is small or the child is large, the first aid provider may use two hands.*
- A compression-to-rescue-breath ratio of 30:2 (30 compressions and two rescue breaths) may be used on a baby or child who is unresponsive with abnormal breathing.*
- For a baby, chest compression depth should be at least one-third of the chest's depth or approximately four cm (one and a half inches).*
- For a child, the chest compression depth should be one-third of the chest depth, or approximately five cm (two inches).*
- The rate of chest compressions should be 100–120 per minute for babies and children (this is the same as for an adolescent or adult).**
- Chest compression should be performed on a firm surface when possible.*
- All emergency medical dispatchers should provide CPR instructions (referred to as dispatcher-assisted CPR) to first aid providers who call regarding an unresponsive baby or child with abnormal breathing.**

Good practice points

- While it is preferred to start with rescue breaths and then compressions, it is also acceptable to start with compressions and then give rescue breaths. Both components are important when providing CPR to children.

Chain of survival behaviours

Prevent and prepare

- Refer to your local or national health authority to identify the main causes of baby and child cardiac arrest in your region. Preventable and preparable causes include choking, drowning or disease.
- Follow recommended baby and child safety practices, including supervision near water and safe sleep habits for infants.

Early recognition

In the first few minutes after cardiac arrest, a baby or child may have agonal breathing (meaning they are barely breathing or gasping noisily and irregularly). This type of breathing is abnormal. If there is any doubt about whether breathing is normal, assume it is not.

Check for a response.

- Baby: Pick the baby up or tap on the sole of their foot. An unresponsive baby will be limp and of an abnormal colour.
- Child: Gently tap the child's shoulders. Speak loudly and clearly, asking a question such as, "Are you alright?"

If the baby or child does not respond or react:

- Open their airway: For a baby, tilt their head slightly to a neutral position and lift their chin. For a child, tilt their head back and lift their chin.

- Check for breathing: Look, listen and feel for normal breathing for up to 10 seconds. Look for chest or abdominal movement, listen for breathing sounds, and feel for breath on your cheek. If you have any doubt whether breathing is normal, take action as though it is not.

First aid steps

If the baby or child's breathing is abnormal (or they are not breathing):

1. Immediately shout for help and ask bystanders to access EMS. If you are alone, access EMS yourself, either using a telephone with the speaker function or–if there is no phone available nearby–leave the person to access EMS. Do this as quickly as possible.
2. Give 30 chest compressions; push down on the centre of their chest at a fast and regular rate (100–120 compressions per minute).
    - If you are a trained responder, you may use a ratio of 15 compressions to two rescue breaths.
3. Give two initial rescue breaths using a mouth-to-mouth-and-nose technique for a baby or a mouth-to-mouth technique for a child. Blow steadily into the mouth or mouth-and-nose for one second until you see the chest or abdomen rise.
4. Continue with cycles of 30 chest compressions and two rescue breaths until emergency help arrives or the baby or child shows signs of life (such as coughing, opening their eyes, speaking or moving purposefully) and starts to breathe normally.

- If an automated external defibrillator is available, ask a bystander to bring it as quickly as possible. Follow the voice prompts, interrupting CPR cycles as little as possible.
- If you are unwilling or unable to give rescue breaths, give chest-compression-only CPR at a rate of 100–120 compressions per minute.
- If more than one first aid provider is present, change providers every one to two minutes to prevent fatigue. Ensure there is minimal interruption to CPR as the next person takes over.
- If you are alone and do not have a way to call EMS while performing CPR (e.g. no speakerphone), perform CPR for one minute before pausing to call for help.
- While performing rescue breaths, be alert to any signs of life such as movement or coughing.
- If the baby or child is unresponsive and breathing normally, maintain an open airway.

Local adaptation

- In contexts that do not have an EMS or other higher level of care, if CPR has not been effective within the first 20 minutes, then (except in cases of drowning and hypothermia) the first aid provider could stop CPR as it is unlikely to be successful.
- Other guidance allows greater flexibility, accepting either a compression-first or ventilation-first approach, and permits pulse checks by trained providers. Overall, some guidance prioritizes early ventilation, while other approaches allow more latitude for trained responders and teams.
- Recommendations for compression–ventilation ratios vary by training and context. In some guidance, a ratio of 15 compressions to two ventilations (15:2) is recommended only for first aid providers who have received specific paediatric basic life support training, while others are advised to use 30:2.

- 15:2 is appropriate for two rescuers and 30:2 for a single rescuer is recommended, although some recommendations require specific training to apply the 15:2 ratio.
- It is reasonable to perform compression-only CPR if the first aid provider is unable or unwilling to give ventilations.
- Some recommendations prioritize the two-thumb encircling technique for all compressions in all situations, using a one-hand (heel-of-hand) technique only when the two-thumb technique is not possible, including during dispatcher-assisted CPR. Either technique can be used, with the one-hand technique when chest encirclement is not possible. Overall, some approaches consistently favour the two-thumb technique, while others allow greater flexibility based on the situation and the first aid provider's ability.
- Guidance may include different levels of detail on anatomical positioning, but both anterolateral (front and side of chest) and anteroposterior (front and back of torso) placements are accepted. Electrode pads must not overlap and a small gap (about one to two cm) between pads is recommended.
- If transporting the baby or child from a remote area to medical care, continuous CPR on a firm surface must be provided during transit.

Access help

- When accessing EMS, very clearly explain that the baby or child is unresponsive and breathing abnormally; this will prompt EMS to prioritize the case appropriately.
- Ask bystanders for help accessing EMS and providing CPR, as well as bringing and using an automated external defibrillator.
- The survival of the baby or child depends upon immediate and effective CPR; when accessing help, keep any interruptions to chest compressions minimal.

Recovery

Even if the first aid responder has performed CPR and defibrillation and the baby or child is now responsive and breathing normally, you must continue close monitoring until EMS attends to them, as they may stop breathing again.

Education considerations

Context considerations

- Refer to and follow the guidance of regional resuscitation councils or other national protocols and tailor education accordingly.
- Consult local regulators to consider differences in regulation and liability protection for first aid providers.
- In some countries, specifically those with a high rate of tuberculosis, rescue breaths may be discouraged. Teach first aid providers chest compression-only CPR (or bag-valve-mask resuscitation if they are professional responders).
- In contexts where there is no EMS available or higher onward care, resuscitation for babies and children can still be attempted.

- Be familiar with local culture, resources and local expectations of healthcare ahead of developing an education programme and contextualize it accordingly (Anderson & Taira, 2018).
- Programme designers could define within programmes two or five initial rescue breaths to be given, depending on what is most commonly advocated in the context.

Learner considerations

- CPR training is an important intervention that can promote a sense of control and reduce the feelings of anxiety and burden experienced by parents with a baby at risk of cardiac arrest (Moser et al., 1999).
- Be aware and respect that some learners may not be comfortable practising with realistic mannequins for psychological or emotional reasons. Arrange alternative practice options.

These considerations are specific to emergency medical dispatchers.

- Emergency medical dispatchers can play a critical role through the prompt recognition of cardiac arrest, provision of CPR instructions by phone, and dispatch of the EMS with a defibrillator. Consider as part of the education for this role:
    - The use of scripted protocols is a helpful way to confirm when a baby or child is in cardiac arrest.
    - Additional training around the recognition of agonal breathing (e.g. playing sounds on a phone or showing a video).
    - How to provide CPR instructions for a baby or child (including rescue breaths and compressions).

Facilitation tips

- Focus on prevention is critical for the survival of babies and children.
- Emphasize the importance of the first aid provider, other bystanders and EMS working together to provide care quickly and effectively.
- Explore the mechanics of the tongue and airway for the breathing check. Allow learners to understand that when the muscles relax, the tongue can block the airway, (so the baby or child cannot breathe). Tilting the head back for a child or into a neutral position for a baby pulls the tongue forward, opening their airway. Sometimes, simply opening the airway will enable the baby or child to breathe.
- If using mannequins, ensure they are realistic in terms of size, weight and features so learners can get a sense of how to perform the skill correctly (Gesicki & Longmore, 2019).
- Help learners understand the desired outcomes of CPR: to get oxygen into the lungs (rescue breaths), to pump blood around the body (chest compressions), and to keep the brain and vital organs functioning until defibrillation can take place.
- Emphasize that learners should avoid excessively providing rescue breaths as the air will enter the baby or child's stomach.
- Emphasize that the goal of resuscitation remains the same for all ages, only the approach is modified. However, first aid providers who know how to perform adult CPR but do not know baby or child CPR may use the same sequence as adults.

- Highlight that the decision to start CPR should be immediate and without delay. Time is critical to a positive outcome. Emphasize that rapid and continuous compressions are also critical for a positive outcome.
- Learners can gain knowledge and some basic skills through self-directed learning, which might save time for practice in face-to-face sessions (Weiner et al., 2011).

Facilitation tools

- Refer to the general approach for tools which can help learners to sequence and prioritize their actions. Mnemonics such as DR ABCD (Danger, Responsiveness, Airway, Breathing, Circulation, Defibrillation) can be of help to some learners to establish a clear course of action.
- Sequence the learning to include discussions about possible scenarios, role play, demonstration, practice with a peer and feedback. Involve learners in deciding on the scene and encourage discussions about how they might access help.
- Discuss with learners the emotions and motivations that they might feel when helping a baby or child who is unresponsive and breathing abnormally. Encourage learners to express their fears and doubts and to share experiences to build confidence to help.
- Use alternatives to resuscitation mannequins when they are not available, such as teddy bears or cushions.

Learning connections

- In contexts where a defibrillator is likely to be available, pair this topic with Unresponsive and breathing abnormally when a defibrillator is available.
- Pair this topic with choking or drowning.
- Some learners learning this topic may benefit from learning about how to provide first aid for mental distress.

Scientific foundation

Pulse check

This discussion draws on three key resources: the 2010 International Liaison Committee on Resuscitation (ILCOR) evidence summary (De Caen et al., 2010; Kleinman et al., 2010), the 2020 ILCOR Paediatric Life Support Evidence Update (Maconochie et al., 2020a; Maconochie et al., 2020b; Maconochie et al., 2020c; Maconochie et al., 2021), and a new systematic review conducted by the ILCOR Pediatric Life Support Task Force for the 2025 Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Katzenschlager et al., 2024).

The 2010 ILCOR evidence summary on pulse checks versus no pulse checks found significant limitations in the accuracy of pulse assessments performed by both first aid providers and healthcare professionals. Studies demonstrated that neither group consistently identified a pulse within ten seconds in healthy infants and children. Two blinded studies further revealed that healthcare providers frequently misjudged pulse status in children without pulsatile circulation and required a prolonged time to confirm the absence of a pulse. The average time to determine pulse absence was 30 seconds (de Caen et al., 2010; Kleinman et al., 2010).

The 2020 ILCOR update did not identify new studies regarding the accuracy of pulse checks compared to assessments of signs of life. Consequently, the 2010 treatment recommendation was upheld, which states that palpation of a pulse (or its absence) is not reliable as the sole determinant of cardiac arrest or the need for chest compressions.

The 2024 systematic review assessed the accuracy of pulse checks based on sensitivity and specificity, using data from three studies with very low certainty evidence. Sensitivity ranged from 76% to 100%, while specificity was lower (64% to 79%). Regarding the duration of pauses in chest compressions, no studies specifically examined infants and children, but one study found that only 39% of participants detected a pulse within 10 seconds, with a median decision time of 18 seconds and 85% accuracy. Inexperienced providers took longer, raising concerns about prolonged interruptions in chest compressions. The findings were based on a less critical setting involving perfused children with normal skin temperature and brisk capillary refill times.

The sequence of chest compressions and rescue breaths

We used the Paediatric Life Support 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations and an ILCOR evidence summary from 2017 for this topic (Maconochie et al., 2017; Maconochie et al., 2020a; Maconochie et al., 2020b; Maconochie et al., 2020c; Maconochie et al., 2021). In 2015, the consensus on science indicated that in adults and children, if we compare CPR beginning with compressions to CPR beginning with rescue breaths, the confidence in effect estimates were so low that it was too speculative to make a recommendation. In 2020, for the same comparison, no new human paediatric evidence was identified. So, the recommendations for the sequencing of CPR steps for babies and children in cardiac arrest remain unchanged from those published in 2015. In 2024, the ILCOR BLS Task Force released a new systematic review for the 2025 Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations about Commencing CPR in adults and children with compressions first (30:2) versus commencing CPR with ventilations first (2:30) . The ILCOR BLS Task Force considers that both an A-B-C (ventilation followed by compression) and a C-A-B (compression followed by ventilation) approach are acceptable and that both ventilation and chest compressions are important components of CPR in children (Bray et al., n.d.)

Chest compression-only CPR versus standard CPR

We used two evidence summaries from ILCOR from 2015 and 2017 (Maconochie et al., 2015; Olasveengen et al., 2017a; Olasveengen et al., 2017b). One systematic review of two extensive observational cohort studies compared chest compression-only CPR to standard CPR with a ratio of 30:2 or 30:2 and 15:2. The review found that significantly fewer people (aged one to 17) experienced favourable neurological outcomes and survived to the one-month mark after receiving compression-only CPR. The result was also significant with fewer people achieving the favourable outcome of the return of spontaneous circulation in the same age group. In babies, there was no demonstrable difference in the outcomes between chest compression-only CPR and standard CPR.

Dispatch-assisted cardiopulmonary resuscitation

An ILCOR evidence summary and a systematic review, both from 2019, explored the impact of dispatcher-assisted-CPR on the survival and neurological outcomes in babies after they experienced out-of-hospital cardiac arrest (Nikolaou et al., 2019; Soar et al, 2019a; Soar et al., 2019b)).

In babies and children, studies reported a significantly higher rate of CPR in the cohorts that offered dispatcher-assisted CPR. They also associated an earlier time to CPR initiation with systems that provided dispatcher-assisted CPR compared with those that provided CPR without dispatch assistance. There were significantly higher rates of favourable neurological outcomes at one month and survival to one month associated with those who received dispatcher-assisted CPR compared with those who received unassisted CPR. The same results are found for favourable neurological outcomes at hospital discharge and survival to hospital discharge.

When comparing babies and children who received dispatcher-assisted CPR and those who received unassisted CPR, one study found that the assisted CPR group reported lower rates of favourable neurological outcomes and survival at one month. However, another study found no difference between the two. The reason seems to be that the start of CPR was longer in the dispatcher-assisted CPR compared to the unassisted bystander CPR cohort.

Chest compression technique

For chest compression technique used on a child and baby we used ILCOR evidence summaries from 2010 (de Caen et al., 2010; Kleinman et al., 2010; Perlman et al., 2010; Wyllie et al., 2010). Several studies on this topic have been published after 2010, but did not change the current recommendation.

In 2010, we did not find any outcome studies comparing one versus two-hand chest compressions for children in cardiac arrest. The only evidence was for healthcare providers and studies using mannequin children. This evidence found that healthcare workers generate higher chest compression pressure when using the two-hand technique and first aid provider fatigue increased when using one-hand compressions.

In newborns, small case series published before 2010 support the current favoured practice of the two-thumb encircling hand technique for chest compressions compared to the two-finger technique. The two-thumb encircling method produces higher blood pressure and can sustain a consistent quality of compressions for a longer time. It is also perceived as easier and less tiring for the provider. In babies and newborns, providers should centre compressions over the lower third of the sternum rather than the mid-sternum.

Compression-to-rescue-breath ratio

Two ILCOR evidence summaries from 2010 on the optimal ratio for chest compressions and rescue breaths for babies and children formed the basis of this scientific foundation (de Caen et al., 2010; Kleinman et al., 2010; Perlman et al., 2010; Wyllie et al., 2010). Five studies using a variety of mannequin sizes compared compression-to-rescue-breath ratios of 15:2 with 30:2. The studies found that a ratio of 30:2 yielded more chest compressions with no or minimal increase in rescuer fatigue. Another study found that we have less “no flow time” and more chest compressions per minute, with a ratio of 30:2 compared to 15:2

With insufficient human data to identify an optimal compression-to-rescue-breath ratio for CPR in babies and children, and ease of teaching and retention, the same compression-to-rescue breath as for adults (30:2) is proposed.

Chest compression depth

The scientific foundation for this topic includes an evidence summary from 2015, a scoping review from 2020 and the Paediatric Life Support 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Considine et al., 2020; Maconochie et al., 2020a; Maconochie et al., 2020b; Maconochie et al., 2020c). All references are from ILCOR and examine the chest compression depth in children.

One study reported a statistically significant relationship between compression depth and the outcomes of one-day survival and the return of spontaneous circulation. Results demonstrated that when 60% or more of chest compressions had an average depth of greater than or equal to 51 mm (compared to less than 60% at this average depth), both outcomes improved. The study found no difference in compression depth for the outcome of survival to hospital discharge. The studies referenced did not document an association between specific chest compression depths and the outcomes of survival to hospital discharge or survival at the one-month mark.

In children with out-of-hospital cardiac arrest, one study found no differences regarding the return of spontaneous circulation when comparing CPR with a chest compression depth of 38 mm or more to a chest compression depth less than 38 mm.

Compression rate

As the scientific foundation for this topic, one evidence summary from ILCOR in 2015 and a 2020 ILCOR scoping review were used on the chest compression rate in children (de Caen et al., 2015a; de Caen et al., 2015b; Considine et al., 2020).

There was an inconsistent association between chest compression rate and the outcome of survival with a favourable neurological outcome. One in-hospital cardiac arrest study reported a correlation between a chest compression rate greater than 100/min in children, compared to a compression rate of 100-120/min. Rates of 120-140/min or greater than 140/min made no difference to survival with a favourable neurological outcome.

In children who experienced cardiac arrest out-of-hospital, a compression rate of 100-120/min, less than 100/min, or more than 120/min made no difference to the outcome of survival at the 24-hour mark.

For the outcome of achieving the return of spontaneous circulation following out-of-hospital cardiac arrest, the following comparisons were also made with regard to chest compression rates used on children. A chest compression rate of 100-120/min, compared to rates of less than 100/min, 120-140/min or greater than 140/min, made no impactful difference. A chest compression rate of 100-120/min compared to rates of less than 100/min or greater than 120/min made no difference.

New data are unlikely to lead to a change in recommendations.

Chest compression recoil

There were no studies reporting outcomes for chest compression recoil in baby or child cardiac arrest.

Interactions between CPR parameters

A 2020 ILCOR scoping review formed the basis of the interactions between CPR parameters (Considine et al., 2020).

One study reported no significant relationship between chest compression rates and chest compression depths. Chest compressions depths greater than 51 mm versus less than 51 mm were not associated with the CPR rate in children.

Unresponsive and abnormal breathing when a defibrillator is available

Key action

Use a defibrillator in the sequence of giving CPR to improve the person's chance of survival.

Introduction

An automated external defibrillator (defibrillator or AED) is a portable device that analyses the heart's rhythm and, if necessary, sends an electric shock (or defibrillation) to help re-establish a normal heart rhythm. Rapid use of a defibrillator can improve the chances of survival for those experiencing sudden cardiac arrest. A bystander with little or no training can use a defibrillator. Public access defibrillators are proven to be safe and effective, allowing defibrillation to take place immediately.

The automated devices have voice prompts and visual aids to follow and are easy to use. Once the defibrillator detects a shockable rhythm, it will automatically deliver a shock (fully automated defibrillator) or instruct the first aid provider to push the shock button (semi-automated defibrillator). A defibrillator does not replace the need for CPR. First aid providers must provide CPR with as few interruptions to chest compressions as possible while setting up and using the defibrillator.

This topic should be used in conjunction with unresponsive and abnormal breathing (adolescent and adult) or unresponsive and abnormal breathing (baby and child).

Guidelines

- The implementation of public-access defibrillation programmes is recommended to improve the outcomes for people with out-of-hospital cardiac arrest.**
- For a person who is unresponsive with abnormal breathing (taking irregular or noisy breaths, or they stop breathing altogether), CPR should be provided until the defibrillator is ready to start analysing the heart.*
- For adults and children, automatic external defibrillation with self-adhesive pads can be used and is very safe.**
- For babies and children younger than eight years of age, a paediatric defibrillator should be used.**
- For babies and children younger than eight years of age, if a paediatric defibrillator or paediatric pads are not available, a standard defibrillator and pads could be used.*
- For adults and children (eight years or older), a standard defibrillator should be used.**
- Fast removal of excessive chest hair can be done before the application of pads, so long as the delay to shock delivery is minimal.*
- For optimal defibrillation in adults, pads greater than 8 cm are more effective.*
- Pads should be placed on the chest according to the description given on the defibrillator or pads. For babies and children, the anterior-posterior placement of self-adhesive pads may be used (one pad on their front, and one pad on their back).*

- For large-breasted individuals, the left electrode pad should be placed beside or underneath the left breast, avoiding breast tissue.*
- First aid providers should continue to perform CPR while the defibrillator is set up and pause only when it is ready for analysis and, if indicated, provides a shock.**
- After the defibrillator administers a single shock, the first aid provider should resume with chest compressions immediately and not delay for rhythm reanalysis or a pulse check. Any pauses in chest compressions before and after the shock should be as short as possible.**
- When compared, biphasic waveforms are more effective than monophasic waveforms for terminating ventricular fibrillation. Purchasers of defibrillators should purchase biphasic automated external defibrillators.**

Good practice points

- Locked cabinets should generally be avoided for public access defibrillators, but if used must allow rapid, clearly instructed access.
- Dispatcher-assisted AED programmes should be monitored for effectiveness, and during an OHCA call dispatchers should identify nearby AEDs, guide retrieval when possible, using updated AED registries, and provide instructions for AED use once available (good practice statement).
- For optimal defibrillation in adults, pads greater than 8cm are more effective.
- Routine removal of a bra is not necessary. If pads can be placed correctly on bare skin by adjusting the bra, removal is not required.
- Anterior–posterior pad placement involves positioning the anterior pad on the left side of the chest between the midline and the nipple and the posterior pad on the left side of the spine just below the scapula. This technique requires more handling than the anterior–lateral position and should be considered only when the anterior–lateral placement is not feasible, and the rescuer is trained to use it.
- In an oxygen-rich atmosphere (where high-flow oxygen is directed across the chest), first aid providers should ensure that defibrillation does not take place until oxygen is discontinued.

Chain of survival behaviours

Prevent and prepare

Find out where the nearest defibrillators are in places of work, home or recreation.

Support or initiate public-access defibrillation programmes to increase the availability of defibrillators in public places, particularly in remote areas or those with longer EMS wait times.

Advocate that large private organizations or facilities, including schools and universities, should have defibrillators accessible.

Ensure that public access programmes are explicit that a person does not have to be a medical professional or specifically trained to use a defibrillator.

Early recognition

A person is unresponsive with abnormal breathing.

First aid steps

1. Begin CPR immediately.
2. Immediately shout for help and ask bystanders to access EMS. If you are alone, access EMS yourself, either using a telephone with the speaker function or–if there is no phone available nearby–leave the person to access EMS. Do this as quickly as possible.
3. Ask a bystander to bring a defibrillator as quickly as possible. If you are alone and the defibrillator is visible in the immediate vicinity, you can leave the person to quickly get it.
4. Use the defibrillator as soon as it is available. Follow the voice prompts, pausing CPR only when absolutely necessary.
    a. Apply the pads to the person's skin on their chest as indicated by the instructions. It does not matter if the pads are in the reverse position. Do not remove them as this wastes time and they may not stick to the chest properly when reattached.
    b. Once the defibrillator prompts that it is ready to analyse the heart rhythm, ensure no one is touching the unresponsive person. Press the button to begin the analysis if this does not happen automatically.
    c. If the machine indicates a shock is necessary, ensure no one is touching the person and warn the others around the unresponsive person. Push the button to give a shock. (Fully automated defibrillators will shock automatically.)
5. Continue CPR unless otherwise instructed to pause (either by the defibrillator or professional responder). Pause CPR if the person shows signs of recovery, such as signs of life (opening their eyes, speaking, crying or moving purposefully) or starts to breathe normally.

Defibrillation for babies and children

The following are the defibrillation preferences for babies and children. They should be used in the order provided (i.e. if option one is unavailable, then option two is acceptable).

1. Paediatric defibrillator.
2. Standard defibrillator with paediatric pads.
3. Standard defibrillator with adult pads.

If you are alone and the defibrillator is visible in the immediate vicinity, you can leave the person to quickly get it.

Access help

- Calling EMS is a priority after beginning CPR. Ask a bystander to call or do it by yourself if you are alone. Inform EMS if you are using a defibrillator.
- If accessing EMS via phone, they should be able to guide you in CPR and how to use the defibrillator.

Recovery

- Even if the first aid provider has performed CPR and defibrillation and the person is now responsive and breathing normally, the person should continue to be closely monitored until they are assessed by a medical professional as they may stop breathing again.

Education considerations

Public access defibrillators

We recognize that public access systems globally may be at different stages of development, but the principle of early defibrillation remains a goal for any unresponsive person with abnormal breathing.

Context considerations

- Refer to and follow the guidance of regional resuscitation councils or other national protocols and tailor education accordingly.
- Consult local regulators to consider differences in regulation and liability protection for first aid providers.
- Where public access defibrillators are present, it is likely that onward medical care is also available. Therefore, learners in these contexts should be made aware of the presence of defibrillators and be empowered to use them.
- Where public access defibrillators are not available, first aid programmes should include information for learners about how to access onward care. Where onward care is not available, first aid programmes need to equip the learner appropriately (see unresponsive and abnormal breathing (adolescent and adult) or unresponsive and abnormal breathing (baby and child)).
- Electrode placement
    - Guidance on electrode placement varies. In adults, anterolateral placement—where one electrode is placed on the front of the chest below the collarbone and the other on the side of the chest below the armpit—is commonly recommended as the first option. Anteroposterior placement—where one electrode is placed on the front of the chest and the other on the back between the shoulder blades—may be used as an alternative when appropriate or when the first aid provider is trained. In some situations, either anterolateral or anteroposterior placement is acceptable.
    - Guidance for children also varies. Anteroposterior (front and back of the child) placement is sometimes recommended for smaller children (<25kg) when this is easy to do. For larger children, either anterolateral placement (front and side of the chest) or anteroposterior placement may be used. Some guidance bases placement on body size, while other guidance uses general body landmarks rather than weight.
- Guidance on electrode size and spacing may differ. Where specified, the largest electrodes that fit the person should be used. Electrode pads should not touch or overlap, and where possible a small gap (about one to two cm) should be left between them.
- Electrode placement

    - For adults, some councils prefer anterolateral (AL) while anteroposterior (AP) is possible if the responder is trained. For others, anterolateral (AL) or anteroposterior (AP) depends on the situation. Finally, some councils offer more flexibility, while others propose a hierarchy (AL priority, AP optional).
    - In children, some councils recommend the AP position for children < 25 kg if easy to handle and AL or AP for larger children. Other councils specify that AL or AP are "reasonable" for all children and more detailed positioning is specified by anatomical areas. Finally some councils distinguish according to weight and others not.
- Electrode size
    - Some councils do not give specific details on minimum size; others specify that the largest possible electrodes should be used, with a separation of at least one to two cm.
    - Finally, some councils provide slightly more details on anatomical positioning but all organizations accept AL and AP positions with no overlap of the pads (with one to two cm space for some).
- In contexts where video-assisted dispatcher support is available to first aid providers, prepare learners for what this is and how it may help them. There is evidence that this technology may further support first aid providers with accurate defibrillator use (e.g. pad placement and delivering shocks) as the video element allows dispatchers to monitor first aid provider actions and provide vital corrections if necessary (You et al., 2008).

Learner considerations

- When possible, educate school administrators and teachers on defibrillators to build their knowledge, skills and confidence before educating students. Doing so will encourage administrators and teachers to implement this type of education and increase their confidence in teaching students how to use a defibrillator (Zinckernagel et al., 2017).
- Include defibrillator education in first aid programmes for young people as well as adults (Zinckernagel et al., 2017).

Facilitation tips

- Advocate that public access defibrillators have clear signage and are placed in highly visible locations (Brooks et al., 2015; Winkle, 2010).
- Ensure learners are familiar with defibrillator signs and icons and can identify where to find one in their local context (Brooks et al., 2015).
- Emphasize that anyone can use an (automated/semi-automated) defibrillator, even someone who has never used one before. There are visual aids and voice prompts that guide them on what to do.
- Emphasize that a defibrillator will only shock someone if needed—it will never shock a healthy heart. If the defibrillator delivers a shock to the person, this does not always mean their heart will restart. The machine will analyse and then detect whether the person's heart has restarted and then give further instructions.
- Use scenario-based learning to provide learners with the opportunity to practise using a defibrillator. Practising will increase their confidence and willingness to act in an emergency.

- Learners should practise providing continuous CPR, minimizing any interruptions, while another person sets up the defibrillator and applies the chest pads. They should practise resuming CPR immediately after a pretend shock.
- Emphasize that time is critical to a successful outcome for the unresponsive person. Evidence indicates survival relies upon:
    - immediate recognition that someone is unresponsive with abnormal breathing
    - early access to help and access to EMS
    - early high-quality CPR
    - early defibrillation with an automated external defibrillator if the machine detects a shockable rhythm.
- Non-professional people can facilitate defibrillator education just as effectively as healthcare professionals (Castrén et al., 2004).

Facilitation tools

Facilitating defibrillator skills

Rapid, good quality CPR remains essential to a successful outcome for an unresponsive person with abnormal breathing when a defibrillator is available. Emphasize the importance of CPR while practising the various techniques for successful defibrillation.

All defibrillators provide visual and verbal instructions, but some are fully automated and some are semi-automated.

Learning connections

- Learners must connect this topic with the CPR skills practice and knowledge.

Scientific foundation

The concept of early defibrillation is well established in improving outcomes from cardiac arrest and there is no new evidence that goes against this principle.

CPR before defibrillation

We used the treatment recommendations from the International Liaison Committee on Resuscitation (ILCOR) for this scientific foundation (Olaveengen et al., 2020a; Olasveengen et al., 2020b). Five randomized controlled trials were identified comparing a shorter and longer interval of chest compressions before defibrillation. A range of outcomes was assessed, including the return of spontaneous circulation and one-year survival with a favourable neurological outcome. When a short period of CPR was provided before shock delivery, the evidence showed no difference in any outcomes. Only one study found a favourable relationship between performing CPR for 180 seconds before defibrillation when the EMS response interval was five minutes or more. However, three other randomized controlled trials could not confirm this relationship. There is inconsistent evidence to support or refute providing a short period of CPR (one and a half to three minutes).

Rhythm check timing

See the summary in unresponsive and abnormal breathing (adolescent and adult).

Pads size and placement for defibrillation

The 2010 ILCOR recommendations have been used for this topic (Sunde et al., 2010). No new evidence was identified in 2020 that modified the recommendations.

For the size of pads, one study demonstrated that increasing the pad size from eight to twelve cm resulted in a decrease in transthoracic impedance and an increase in shock success (Dalzell et al., 1989). Other studies showed that larger paddle or pad sizes of the same diameter lowered transthoracic impedance. The chest wall size and anatomy limit the maximum paddle or pad size.

For placement studies, many pad positions were studied. One study supports the anterior-posterior position, another study supports the anterior–lateral position, and one study supports the anterior-apex position. At least five studies found no effect of electrode positioning, while one study showed that pads should be placed under the breast tissue.

Two studies showed that hairy males should be shaved before applying pads.

In summary, pads should be placed on the exposed chest in an anterior–lateral position, but alternatives are also acceptable. Fast removal of excessive chest hair can be done before applying pads.

Waveforms, energy levels and strategies

The scientific foundation is based on the 2010 ILCOR recommendations (Sunde et al., 2010). These topics have not been reviewed since 2020.

For the comparison of biphasic with monophasic defibrillation waveforms, three trials and four human studies found that biphasic waveforms are more effective in terminating ventricular fibrillation. There is insufficient evidence to recommend any specific biphasic waveform. Nevertheless, in the absence of biphasic defibrillators, monophasic defibrillators are acceptable.

For the waveform and energy level, there are insufficient high-quality human studies on the different waveforms and energy use, making it difficult to make clear recommendations. It is proposed to start defibrillation at a selected energy level of 150–200 joules for a biphasic truncated exponential waveform. There is also insufficient evidence to determine the initial energy levels for any other biphasic waveform. Although evidence is limited, because of the lower total shock success for monophasic defibrillation, initial and subsequent shocks using this waveform should be at 360 joules.

For the energy level of the second and subsequent biphasic shocks, the same initial energy level is acceptable. Studies of biphasic waveforms with varying strategies (fixed and escalating) and energy levels do not find clear evidence of the superiority of one strategy over another. It is reasonable to increase the energy level when possible.

Compared to three-stacked-shock protocols, one-shock protocols suggested significant survival benefit in three design studies and showed a significantly lower hands-off ratio (i.e. the percentage of total CPR time when no compressions were provided). Studies also show that the success of the protocol is more dependent on the quality of CPR in different studies than on the protocol used. Therefore, when defibrillation is required, a single shock should be provided with

the immediate resumption of chest compressions after the shock and chest compressions should not be delayed for rhythm reanalysis or pulse check immediately after a shock.

There are no human data to confirm the superiority of fully or semi-automatic defibrillators and no additional evidence has emerged since 2020. The current recommendations continue to apply.

Defibrillation near supplementary oxygen

In 2010, ILCOR completed an evidence summary that formed the scientific foundation for this topic (Sunde et al., 2010). Five case reports described instances where defibrillation attempts with paddles used in the vicinity of high-flow oxygen (greater than 10 litres per minute) generated sparks that caused fires. There were no case reports of fires when shocks were delivered using adhesive pads.

Two mannequin studies found that oxygen concentration in the zone of defibrillation was not increased when the oxygen source was vented at least one metre behind the unresponsive person's mouth. One study described higher oxygen concentrations and longer washout periods when oxygen was administered in confined spaces without adequate ventilation.

Analysis of rhythm during chest compressions

ILCOR recommendations form the basis of this scientific summary (Olasveengen et al., 2020). Some modern defibrillators include artefact-filtering modes that enable visual or automated rhythm analysis during ongoing chest compressions. Earlier evidence consisted mainly of animal and simulation studies, which demonstrated feasibility but did not evaluate this technology during actual cardiac arrest. No studies had assessed its impact on critical or important clinical outcomes.

Two new observational studies have since been identified in 2022 CoSTR (Wyckoff et al., 2022a, Wyckoff et al., 2022b). These studies reported that rhythm analysis during CPR was associated with fewer pauses in chest compressions, although they still did not assess effects on patient-centred outcomes.

Public-access defibrillation (PAD)

Two systematic reviews (Bækgaard et al., 2017; Holmberg et al., 2017) and the adult basic life support recommendations from ILCOR provide the scientific foundation for this section (Olasveengen et al., 2020a; Olasveengen et al., 2020b). When we compare public access automated defibrillator programmes versus systems with traditional EMS response, we can find that for the critical outcome of survival with favourable neurological outcome, one observational study showed an improvement after a public access defibrillator programme at one year. Seven observational studies enrolling more than 40,000 people demonstrated an improvement after a public access defibrillator programme at 30 days.

We also found that the PAD programme improved hospital discharge with favourable neurological outcome, survival to 30 days, and survival to hospital discharge. In all cases, the evidence is low or moderate. No new scientific evidence has been sufficient to warrant a change to the 2020 treatment recommendation.

AED accessibility (locked cabinets)

Locked AED cabinets are used to prevent theft, vandalism and misuse, but their impact on timely access was unclear. Ten studies were identified, many not peer-reviewed. Reported rates of theft or vandalism were low (<2%) and similar between locked and unlocked cabinets (Bray et al., 2025a; Bray et al., 2025b). No study evaluated the effect of locked cabinets on patient outcomes. However, two simulation studies showed that security measures, including locked cabinets, significantly delayed AED retrieval, and one survey reported injuries from breaking glass to access the device.

It is noted that although theft occurs, it is rare and may sometimes reflect AED use in an emergency rather than true theft. Cabinets requiring a code obtained by calling EMS may introduce additional delays.

Locked cabinets should generally be avoided for public access AEDs, and when used must allow rapid access, with EMS ensuring the device is retrieved after use.

Optimization of dispatcher-assisted AED retrieval and use

The 2024 scoping review on dispatcher-assisted AED retrieval found limited but supportive evidence for improving AED access during out-of-hospital cardiac arrest (Snow et al., 2025).

EMS systems using dispatcher-assisted public access AED programmes should actively monitor their performance. Once cardiac arrest is recognized and CPR has begun, dispatchers should ask whether an AED is available and be updated when one arrives. If no AED is immediately accessible and multiple rescuers are present, dispatchers should guide someone to locate and retrieve an AED, ideally using accurate and up-to-date AED location registries. When an AED reaches the scene, dispatchers should provide instructions for its use.

Lay rescuer use of automated external defibrillators for babies and children

Since the last recommendation for this topic in 2010 (Sunde et al., 2010), the Paediatric Basic Life Support Task Force reviewed the evidence for the 2020 and 2022 CoSTRs. These updates found insufficient new evidence to modify the existing recommendations. The 2025 Evidence Update identified no new paediatric studies that would change current conclusions, and there is insufficient evidence to justify conducting a new systematic review (Scholefield et al., 2025a; Scholefield et al., 2025b, Scholefield et al., 2025c).

Automated external defibrillators can shorten time to shock, and first aid providers have successfully used AEDs in infants and children. Available data suggest that AED algorithms have an acceptable safety and efficacy profile in babies and children, although high-quality clinical evidence remains limited.

AED use by lay rescuers is advised for children older than one year with non-traumatic OHCA, while evidence is insufficient to guide use in infants under one year. When available, a paediatric AED or dose attenuator should be used, but an adult AED is acceptable if no paediatric option exists, including for infants.

Energy doses for defibrillation

For this topic, we used the Paediatric Life Support 2020 and 2025 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (Maconochie et al., 2020a; Maconochie et al., 2020b, Scholefield et al., 2025a; Scholefield et al., 2025b; Scholefield et al., 2025c). Shockable ventricular arrhythmias—ventricular fibrillation and pulseless ventricular tachycardia—are less frequent in children than in adults but are associated with higher survival rates than nonshockable rhythms. Early defibrillation remains essential, yet the optimal energy dose is still uncertain, and notable differences persist among ILCOR member councils.

The 2020 ILCOR CoSTR found no paediatric human studies linking either the initial or cumulative defibrillation energy dose to survival to hospital discharge, long-term survival or survival with good neurological outcome. A 2022 Evidence Update identified one additional paediatric in-hospital registry study, published after the 2020 review. This study showed that first-shock doses outside approximately 1.7–2.5 J/kg were associated with lower survival in infants and children with initial ventricular fibrillation, supporting 2 J/kg as a reasonable initial dose. A more recent systematic review (2024), including seven observational studies, provided very low-certainty evidence and showed no significant difference in outcomes when initial doses <2 J/kg or >2 J/kg were compared with doses around 2 J/kg.

In the absence of evidence demonstrating a clear advantage for any specific energy dose, an initial defibrillation dose of 2–4 J/kg for infants and children in VF or pVT cardiac arrest is proposed. Evidence remains insufficient to guide recommendations for second and subsequent shocks.

Education review

We looked for evidence which contained insights into education considerations on the use of defibrillators. From the 22 papers that appeared in our search, we identified five for review.

Educating school administrators and teachers

Zinckernagel et al. (2017) ran a qualitative study using semi-structured interviews and focus groups with 25 participants, including nine school leaders and 16 teachers from eight different secondary schools in Denmark. Overall, the results indicated that educating school administrators and teachers about defibrillators affects their attitudes and acceptance of defibrillators within school settings. The perceived ease of use of defibrillators by the participants in this study is correlated with their familiarity with defibrillators. Additionally, participants believed defibrillator education to be helpful, but were unclear whether secondary school-aged students should have defibrillator education and access to these devices. These findings indicate that school educators are “gatekeepers” for determining how and whether student defibrillator education will be implemented in schools. It suggests that defibrillator education should be given first and foremost to school administrators and teachers, prior to implementing education for students. Educator attitudes and acceptance of defibrillators are crucial to successful defibrillator student education within schools and the overall perception of defibrillator ease of

use. Moreover, this study demonstrates that schools may not be aware that defibrillator education is safe and appropriate for students.

Placement of defibrillators

Winkle (2010) compares the use of defibrillators within various settings and highlights that defibrillators are most effective and cost-effective when placed in environments which have a high number of people passing through (e.g. airports, casinos, health clubs). Additionally, the author finds that defibrillators in a community or individual residences are less likely to be used and do not change the rate of resuscitation. These findings suggest that if defibrillators are placed in certain public settings, the public should be made aware of their existence, location and how to use them.

Brooks et al. (2015) examine whether low rates of public access defibrillator use by bystanders are attributed to public confidence and knowledge. The study took place at a busy shopping centre in the United Kingdom. Using semi-structured interviews and open-ended questions, 1,004 participants, ranging in age from 9-90, answered questions about first aid education, basic life support and defibrillator knowledge. They were also given a scenario involving witnessing someone who had collapsed and was unresponsive and asked to describe step-by-step their actions. A majority of participants (79%) reported that they had knowledge of what to do if someone was not breathing and knew what a public access defibrillator was. However, only 26.1% of participants knew how to use a defibrillator. Just 5.1% of participants knew how to locate the nearest public access defibrillator and 3.2% said they would try to locate a defibrillator. Only 2.1% would attempt to find the defibrillator and use it in a cardiac arrest emergency. The findings of this study indicate that low defibrillator use stems from inadequate public awareness, education and confidence regarding defibrillators, rather than a lack of defibrillators installed in public settings. The authors suggest that defibrillators are not well-marked or placed in highly visible locations, thereby impacting public awareness of their existence. Moreover, previous first aid education influenced the rate at which participants were able to locate defibrillators and their willingness to retrieve and use them.

Professional healthcare instructors versus non-healthcare-professional instructors

Castren et al. (2004) compare the resuscitation skills of learners educated by non-healthcare-professionals to those educated by healthcare professionals. All learners (n = 38) had no prior experience with defibrillators. Ten pairs of learners were educated by four newly educated non-healthcare-professional instructors and the other nine pairs were educated by four healthcare professionals. All eight instructors provided a four-hour course in basic lifesaving and defibrillator skills, and then after two weeks, they received a four-hour instructor course. All learners participated in two scenarios, using a trainer-defibrillator and a mannequin. Each pair was assessed with a 49-point checklist. A control group of trained first aid staff from the Red Cross was used. Results showed no difference in the performance rates of learners educated by non-healthcare professionals and those educated by healthcare professionals. However, the nearly 100% correct performances of the educated first aid control group highlighted the importance of the continuous and frequent practise of basic lifesaving and defibrillator skills. This group practised basic lifesaving and defibrillator skills every two weeks. This study suggests that non-healthcare professionals can deliver basic lifesaving and defibrillator skills education

just as effectively as healthcare professionals. Non-healthcare professionals may have more capacity than healthcare professionals to engage in education, and they may be able to educate others in the community on a larger scale. There is a need for improved and confident timing of step-by-step actions (e.g. positioning of pads for defibrillation) by learners. As timing is crucial for optimal effectiveness of care, this may be something to specifically address when educating.

Dispatcher-assisted video

You et al. (2008) examine whether the approach of providing defibrillator instructions for untrained first aid providers via dispatcher-assisted video phone technology improves the success of defibrillator use. In the study, 52 public officers with no previous defibrillator education or experience were recruited. All participants were provided with a universal prompt, a phone with video capacity, a trainer-defibrillator, and a dressed mannequin to simulate an unresponsive person with abnormal breathing. All participant phones were connected with an emergency dispatcher using the same video phone technology. The results suggest that video-assisted phone technology may further support first aid providers in accurately using defibrillators (e.g. pad placement and delivering shocks), as the video element allows dispatchers to monitor first aid provider actions and provide corrections if necessary.

Unresponsive and abnormal breathing with suspected opioid overdose

Key action

Use naloxone for a suspected opioid overdose, if available and legally permitted, when giving CPR to improve the person's chance of survival.

Introduction

Use of drugs, especially opioids, can cause impaired mental status, unresponsiveness and breathing difficulties. These effects can be more noticeable and more dangerous in certain situations, such as when used in combination with other substances, including alcohol, and may result in an overdose. An opioid overdose is a life-threatening condition resulting in abnormal breathing (e.g. irregular or noisy breaths, or no breathing at all) that leads to cardiac arrest. Deaths from opioid overdose are an increasing public health problem in many countries worldwide. Naloxone is a drug that reverses the effects of an opioid overdose if taken in time (World Health Organization, 2020b), so the administration of this antidote can be a powerful life-saving tool. However, this topic provides an example of complex social dynamics at play with whether or not people experiencing an overdose receive help, and whether others are equipped to help.

Guidelines

- The first aid provider should start CPR immediately for any unconscious person breathing abnormally.**
- The first aid provider should use naloxone for a person breathing abnormally or in cardiac arrest if they suspect the person has used opioids.*

Good practice points

- The first aid provider who encounters a person with suspected opioid overdose who is unresponsive and not breathing or not breathing normally should immediately initiate high-quality cardiopulmonary resuscitation (CPR), activate the emergency response system and administer naloxone if available.
- In suspected opioid-related cardiac arrest, CPR should be provided with rescue breaths if the first aid provider is willing to give them.
- The administration of naloxone to a person experiencing a suspected opioid overdose may be considered by first aid providers who have appropriate training and if local regulations allow.
- The first aid provider should follow the guidance on the naloxone package to administer it. Application is usually by nasal spray or by injection into the upper arm or thigh muscle. The provider should continue CPR while naloxone is being administered, if possible.
- It is more important to start CPR than to search for how to administer naloxone in a suspected opioid cardiac arrest.

- Following the administration of naloxone, if there is no improvement after five minutes or if the signs of intoxication reappear, the first aid provider may repeat the administration of a new dose of medication.
- People who use opioids should be trained to recognize an overdose, how to administer naloxone and how to provide CPR.
- Family members, caregivers and peers of people who use opioids may also be trained in overdose recognition, providing CPR, naloxone administration and how to access additional care.
- Specially trained first aid providers, such as harm reduction workers, community health workers, other social care workers or law enforcement staff, should be familiar with administering naloxone.
- Professional responders such as paramedics should know how to administer naloxone and train others to do so. They should be encouraged to treat people who use opioids with equity and dignity and to recognize that people who use opioids can provide life-saving interventions in the instance of overdose.
- The lived experience of opioid overdose by people who use drugs should be drawn upon in education interventions to improve educational effectiveness.

Chain of survival behaviours

Prevent and prepare

- Support community programmes which help people who use opioids and their families to develop an awareness of the dangers of opioid use and the risks associated with overdose.
- Advocate for dedicated support (i.e. access to naloxone and training to use it) to people at high risk of overdose.
- Advocate safe prescribing regulations for opioids, and adequate support and education for those using prescription opioids.

Early recognition

- The signs of an opioid overdose can vary based on the type of chemical substance and the dose taken. Empty bottles or blister packs of drugs, syringes, needles and spoons for preparing the injection may point toward an opioid overdose.
- The person is unresponsive with abnormal breathing. Their breathing may be slow or absent, or they may make a snoring or gurgling sound.

First aid steps

1. Begin CPR immediately with rescue breaths if possible.
2. Immediately shout for help and ask bystanders to access EMS. If you are alone, access EMS yourself, either using a telephone with the speaker function or–if there is no phone available nearby–leave the person to access EMS. Do this as quickly as possible.
3. Ask a bystander to bring naloxone as quickly as possible.
4. Administer the naloxone according to the guidance provided as soon as it is available, pausing CPR only if absolutely necessary.

5. Continue CPR with rescue breaths, if possible, until the person shows signs of recovery, such as signs of life (opening their eyes, speaking or moving purposefully), starts to breathe normally, or until EMS takes over.
6. If there is no improvement after five minutes (or if the signs of overdose reappear), repeat the administration of a new dose of medication.

- When delivering CPR, rescue breaths may be beneficial for someone who is experiencing an opioid overdose, as their cardiac arrest is usually due to abnormal breathing, so there may be low levels of oxygen in their blood.
- If you are alone and the naloxone is in the immediate vicinity, you can leave the person to quickly get it.
- It is possible that administering naloxone may cause the person to wake up suddenly with confusion and sometimes aggression. Be prepared for this and adjust your distance and behaviour to respond to the situation.
- If possible, make a note of the time the naloxone is administered and provide this information to EMS or another medical professional.

Access help

- In an instance where you are unable or unwilling to approach the person experiencing an opioid overdose, access help as quickly as possible.
- An opioid overdose is a life-threatening condition requiring urgent medical care. Explain the condition of the person clearly and accurately to EMS so they can prioritize the person's case.
- Even if naloxone has been administered and the person shows signs of recovery, EMS should be accessed, as there is a chance the person may relapse into overdose. Naloxone generally remains effective for about five to ten minutes. Monitor the person's breathing closely in case further administration of naloxone or CPR is required while waiting for help to arrive.

Education considerations

Context considerations

- The administration of naloxone varies depending on the context. Consult local authorities on the current administration methods and regulations.
- Opioid overdose is a growing concern worldwide and programme designers need to consider the prevalence in their country, the populations it affects and the contexts in which those populations live.
- People who use substances may experience stigma and marginalization from healthcare services. Consider education approaches with this in mind, ensuring your behaviour is inclusive and ethical, and actively advocating against discrimination.
- Tailor education approaches to the context while being careful not to label learners or make assumptions about them (such as literacy levels, attention span, ability, etc.).
- Develop education opportunities through partner organizations with specialized knowledge of the learners, where possible.

Learner considerations

- There are many learner groups who can be targeted with education on this topic, including social workers, community health workers, first responders, legal enforcement staff and the friends, peers and families of people who use opioids (Buchman et al., 2018; Seal et al., 2003; Strang et al., 2000).
- Bear in mind that some learners might struggle to find a time when they can learn. Work with partner organizations to identify when sessions should happen, how long they should last and what other adaptations you might need to make (Taylor et al., 2019).
- Some learners may have had a traumatic experience of an opioid overdose. Ensure facilitators are aware of this and prepared to deal with it (Taylor et al., 2019).
- Learners may feel disconnected from or unable to access EMS, possibly because they are afraid or have had a negative experience. Help these learners to build confidence to act by describing their role in the chain of survival behaviours and in the continuum of care that they become part of (Lankenau et al., 2013; A. M. Orkin & Buchman, 2017).
- Be considerate of the stigma that some learners feel (Dechman, 2015; Neale et al., 2019).

Facilitation tips

- The focus of education should be on:
    - how to recognize an opioid overdose
    - how to react to an emergency involving an opioid overdose
    - how to effectively administer naloxone.
- Develop learner-led education sessions where learners are encouraged to share their experiences, knowledge and fears to shape the educational experience. Learners might have lived experience related to this topic that facilitators can draw on, both empowering the learner and enriching the learning experience for others (Buchman et al., 2018; Taylor et al., 2019).
- If scenarios are used, be careful not to stereotype the situation or the person who is overdosing. Opioid use covers all sectors of society.
- Try using a guided (non-scripted) approach to sessions as this allows the learners to direct the session with the facilitator confirming the techniques in summary.
- Ensure learner groups are not too small as this can reduce the potential for conversation and discussion. Groups of five or six learners can work well, allowing time for each learner to share their experience. Avoid facilitating large learner groups as this can be intimidating and hard to develop engagement.
- If the learner group is composed of people who use opioids, consider keeping education sessions short (20 to 30 minutes) with regular breaks.
- Be alert to the fact that learners may know more about street substances (names and types) and how they affect people than the educator. Facilitators should not pretend to know everything, but instead empower learners to share their knowledge.
- Raise awareness that most of the time, the first aid provider will know the person and that they use opioids. It is more uncommon to need to respond to a stranger.

Facilitation tools

- Storytelling may be a very effective method of delivery for this learner group.

- Have pictures of substances, the materials used to take substances and locally available naloxone kits to show learners.
- Peer to peer learning can be an effective way for learners to provide mutual support to each other.
- If using the AVPU scale (Alert, Verbal, Pain, Unresponsive), which describes the type of stimulus a person reacts to and can be used to determine the level of responsiveness, note that a person with an opioid overdose may respond to a painful stimulus.

Scientific foundation

Opioid overdose causes central nervous system depression (sleepiness, unresponsiveness) and respiratory depression (slowed and then stopped breathing), which, if untreated, can progress to cardiac arrest. Naloxone is an effective antidote that reverses the effects of opioid overdose, restoring consciousness and breathing.

These Guidelines are based on the 2024 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (Greif et al., 2024a; Greif et al, 2024b) and the 2024 American Heart Association and American Red Cross Guidelines for First Aid (Hewett Brumberg et al., 2024). They highlight the increasing burden of opioid-associated out-of-hospital cardiac arrest (OHCA), emphasizing the challenge of distinguishing opioid-related emergencies from other causes of cardiac or respiratory arrest. Most opioid deaths involve polypharmacy or comorbidities, with respiratory depression leading to arrest.

Key recommendations include:

1. Airway and ventilation management: Initial treatment should prioritize airway opening and rescue breathing, and resuscitation should continue if spontaneous breathing does not return.
2. CPR as the primary intervention: Since no high-quality studies demonstrate improved survival from naloxone use in cardiac arrest, high-quality CPR should remain the primary focus. Naloxone may be administered, but must not delay CPR.
3. Emergency system activation: Immediate activation of emergency services is crucial, as opioid toxicity cannot always be reliably identified. Naloxone is ineffective for non-opioid overdoses and may require repeat dosing due to its shorter duration compared to long-acting opioids.
4. Naloxone use: Naloxone is effective for opioid overdose in out-of-hospital settings. Intranasal naloxone has been compared to intramuscular naloxone, showing good efficacy. Intranasal naloxone is now widely available in many countries, which makes it easier for first aid providers to use. Naloxone is not necessary for people who are breathing normally. Naloxone is only effective against opioid overdoses and does not treat cardiac arrest. As it takes several minutes to take effect, continued CPR is essential while waiting for it to work.
5. Naloxone safety and effectiveness in respiratory arrest: Over 20 studies confirmed that naloxone is safe and effective, with rare dose-related complications. Recurrent respiratory depression is possible in patients, and they need observation after naloxone

administration. Patients recovering from naloxone may require prolonged observation, especially after long-acting opioids.

6. Training and education: Studies show that opioid overdose training, especially with skill practice (e.g. naloxone administration), significantly improves response to opioid emergencies. Individuals trained to recognize opioid overdose are more likely to administer naloxone.

The guidelines underscore the importance of airway management, timely CPR and appropriate naloxone use without delaying critical interventions.

Education review

Ten papers are included in this review, which provide insight into different aspects of this topic over the last 20 years. They are all from either the US, Canada or the UK, reflecting an evidence gap from other parts of the world.

Willingness to help

Strang et al. (2000) present findings from interviews with 115 people attending a methadone maintenance clinic. It was found that people who use substances have a high level of willingness to help others experiencing an overdose. Strang et al. conclude there is an urgent need to increase education opportunities and effectiveness for the user group.

Take-home emergency naloxone

Seal et al. (2003) reflect on the potential of access to take-home naloxone. The study frames this access as a peer-based, life-saving addition to accessing emergency services, but acknowledges the need for it to be embedded within a wider overdose management plan, which incorporates education and community support. Strang et al. (2013) developed this concept further in a randomized trial where prisoners were given take-home naloxone and identified the need for training to be integral to the provision of the antidote. Klimas et al. (2015) added to this by identifying a need for healthcare professionals to be trained in how to support people in taking naloxone.

Improving access to emergency care

Following a study in Scotland on the effectiveness of overdose education and naloxone distribution programmes (McAuley et al., 2017), Orkin and Buchman (2017) stated that such educational programmes should not distance people from emergency medical services at the very moment when they are most vulnerable and most in need of professional care. Rather, education should integrate bystander and first aid interventions for opioid overdose with a continuum of appropriate care.

This theme was further explored by Buchman et al. (2018) in a discussion paper on the ethics of such education programmes and the intentional and unintentional impact that they might have on vulnerable populations. They argue that having alternative approaches to care for people already excluded from mainstream services does little to dismantle the structural barriers that separate stigmatized people from healthcare systems—and may entrench exclusion. They go on to suggest that naloxone distribution programmes only provide part of the answer, and the bigger question is one about the broader social determinants of drug use

and stigma. While empowering learners from vulnerable and excluded populations through the acknowledgement of their lived experience, the challenge of inaccessibility to mainstream healthcare for them is exacerbated.

In a study to assess community-based opioid prevention programmes in the US, a key barrier identified to providing help was fear that calling EMS would draw police to the scene in addition to paramedics (Lankenau et al., 2013). Dechman (2015) reports on a similar barrier to calling for help, which is the attitude of those who arrive to provide care, which can sometimes be humiliating and degrading. This can lead to first aid providers (peers) developing a range of additional roles to support their peer group without having to face professional healthcare providers.

Competence to help

Neale et al. (2019) built on this evidence base with training for people who use opioids to test their competency to help effectively. They cited literature and experiences of people who felt stigmatized and routinely associated with incapacity to deal with the harms they caused. Their experiment found high levels of competency despite the diverse cognitive, emotional, experiential, interpersonal and social factors over which they had little control.

Considerations for learning design

Taylor et al. (2019) used quantitative methods to test whether introducing an additional naloxone component to overdose education for people who use substances and their peers would affect the confidence and willingness to respond effectively to an overdose and collected qualitative feedback from educators. Findings were pertinent to educators in the following ways:

- The need for facilitators to create a safe space for learners to talk, and for space in the session to be given to learners to share experiences and provide peer to peer support.
- The need for facilitators to be extremely flexible in when to plan sessions, given the chaotic nature of the lives of some of the participants, including attention spans and the need for frequent breaks.Consideration of learning materials, taking into account reading levels and the time available for providing feedback during a time-limited session.

Drowning

Key action

Provide flotation and get the person out of the water as soon as possible so you can support their breathing.

Introduction

Drowning is the process of experiencing breathing difficulties due to being under or in a liquid, such as water. Drowning results in a lack of oxygen reaching vital organs such as the brain and heart. The drowning process begins when the person's airways are below the surface of a liquid. Initially, the person attempts to hold their breath, but then, unable to breathe air, breathes liquid into their airways (Szpilman et al., 2012). If there is no rescue and they remain unable to breathe, the person becomes unresponsive and their breathing and circulation systems fail.

Drowning is a leading cause of unintentional injury-related deaths worldwide. There are an estimated 300,000 annual drowning deaths worldwide (World Health Organization, 2024b). Global estimates may significantly underestimate the actual public health problem related to drowning. Incidence, circumstances and those at risk of drowning vary considerably worldwide. However, low- and middle-income countries account for over 90% of unintentional drowning deaths. Most drowning accidents occur in ponds, ditches, lakes, rivers and the sea. The drowning mortality rate for men is twice as high as for women overall (World Health Organization, 2024b).

Guidelines

- Rescue equipment such as throw ropes or ring buoys (life belts) can be used effectively to assist a person at risk of drowning.*
- Cardiopulmonary resuscitation (CPR) should be started without delay on a person who is unresponsive and has abnormal breathing (e.g. taking irregular or noisy breaths, or they have stopped breathing altogether) as soon as they have been removed from the water.**
- Rescue breaths should be provided as part of CPR to a person who has drowned and is unresponsive with abnormal breathing.*
- If an automated external defibrillator is easily accessible, it may be used on a drowned person who is unresponsive with abnormal breathing. Pads should be applied to skin that has been dried. First aid providers should perform continuous CPR until the device begins to analyse and then restart CPR after analysis.*
- In-water resuscitation (consisting of early rescue breaths and airway management) is NOT recommended for first aid providers. In-water resuscitation should only be attempted by rescuers who are specifically and repeatedly trained and practised in contact-rescue techniques and only in safe conditions.*

Good practice points

- First aid providers should be alert to danger and always prioritize their own safety.

- An attempted rescue by first aid providers should be made without entering the water, either from land or a boat, by reaching with something rigid (e.g. a pole or tree branch), or by throwing a rope or buoyant object. Providers should not touch an actively drowning person because of the risk of being pulled into the water.
- If a first aid provider is already in the water and attempting a rescue, they should have some knowledge of the aquatic environment and use a flotation device.
- The possibility of a spinal injury should not delay the removal of an unresponsive person from the water.
- A person who is unresponsive and breathing normally should be positioned or transported in the recovery position, lying on their side with their head positioned to allow any fluids to drain from their mouth. Any pressure on their chest that may cause breathing difficulty should be avoided.
- First aid providers resuscitating a person who has drowned must prioritize upper airway management and early rescue breathing. Lay people should use a compression-first strategy (C-A-B); however, healthcare professionals and those with a duty to respond to drownings (e.g. lifeguards) should consider using rescue breaths first (A-B-C) before chest compressions, if they have been trained to do so.
- Manual methods to remove material in the airway should only be used when the airway is blocked by vomit or debris that is preventing breathing. Manual methods include using fingers to remove a visible foreign object from the person's throat or positioning the person to enable fluid or vomit to drain out.
- If the first aid provider is trained and oxygen is available, the provider may give oxygen to a person who has drowned and is breathing normally.
- Supplemental oxygen for resuscitation of a person who has drowned may be used, but doing so should not delay CPR, including opening the airway and providing rescue breaths and chest compressions as needed.
- Parents, caregivers and habitual swimmers should be encouraged to have rescue equipment with them, and they should know how to use it effectively.
- Swimming courses should include all domains of the "Drowning chain of survival" to improve water competencies.

Drowning chain of survival

First aid for drowning incidents is often linked to demanding rescues, which endanger the life of the first aid provider. It is important to act quickly to help the drowning person breathe again. For this reason, a problem-specific "Drowning chain of survival" was developed to define the key steps to providing a rescue (Szpilman et al., 2014).

Prevent drowning

The following measures can be adapted locally to reduce risk factors or strengthen protective factors related to drowning.

- Advocate for people to install barriers to control access to water (World Health Organization, 2017, 2024d).
- Become competent in and around water and advocate for people to continue to improve their aquatic skills (swimming, floating, life jacket use, local hazard recognition, rescue, CPR) (Stallman et al., 2017; World Health Organization, 2017; World Health Organization, 2024).
- Teach school-age children swimming and water competencies (World Health Organization, 2017; World Health Organization, 2022; Criel et al., 2025).
- Provide safe places (e.g. a day-care centre) away from water for pre-school children, with capable child care (World Health Organization, 2017, ; World Health Organization, 2022; De Buck et al., 2021).
- Train bystanders in safe rescue and resuscitation (World Health Organization, 2017; World Health Organization, 2022).
- Encourage caregivers to conduct a risk assessment prior to trips to or at bodies of water (Denny et al., 2019).
- Encourage caregivers (e.g. parents or other family members, daycare providers, teachers, youth group leaders, water sports or swimming coaches) to provide constant and close supervision of young children and inexperienced swimmers around, near and in the water.
- Set the expectation that all water activities (e.g. swimming or snorkelling) should be done with at least one other person (i.e. the “buddy system”) (Dunne et al., 2021). Additionally, if swimming alone in open water, swimmers should take a swim buoy with them.
- Encourage communities to engage in water safety programmes to build a collective understanding of the dangers and preventive strategies for activities in, on or near water.
- Build resilience and manage flood risks and other hazards locally and nationally (World Health Organization, 2017; World Health Organization, 2024).
- Advocate that safe boating, shipping and ferry regulations are set and enforced (World Health Organization, 2017; World Health Organization, 2024).

Strategies

- Strengthen public awareness of drowning through strategic communications (World Health Organization, 2017; World Health Organization, 2024).
- Promote multisectoral collaboration (World Health Organization, 2017; World Health Organization, 2024).
- Work with other organizations to ensure consistent messaging and reach a wider audience.
- Take part in or initiate a national water safety plan (World Health Organization, 2017; World Health Organization, 2024).
- Conduct advanced drowning prevention through data collection and well-designed studies (World Health Organization, 2017; World Health Organization, 2024). This could include evaluating the effectiveness of your own programmes.

Recognize distress

The first aid provider should recognize and interrupt the drowning process as soon as possible. Often the drowning person experiences a triggering incident, then loses control of their ability to breathe or move in the water. They may struggle and then submerge and breathe in water. The process is very quick, lasting from seconds to just a few minutes before the person can no longer surface.

The following may indicate a person is drowning:

- Behaviour or actions that do not correspond to the person's abilities (e.g. a child alone in the water or swimming in a deep area).
- They do not respond to the question "Are you OK?".
- Their mouth is below the water or they are gasping or spluttering.
- They appear to be struggling to breathe.
- Their head is underwater or they are face down.
- Their body position has changed from being horizontal (swimming position) to vertical (they may appear to be climbing an invisible ladder).
- They are pushing their arms down like a watermill on the surface of the water.
- The person is trying to swim in a particular direction but making no progress.
- The person is not moving in any direction but bobbing up and down.
- The disappearance of a person last seen in the water.

Drowning is often quiet. A person who is in distress may not wave or call for help. Quick recognition is crucial for a positive outcome following a drowning incident.

As soon as it is recognized that a person is in distress, the first aid provider should ask for help from other bystanders, lifeguards or emergency services. If possible, someone should stay on the scene and constantly observe where the drowning person is in the water.

Provide flotation

If the drowning person is responsive, the first aid provider should provide flotation to keep the person's airway above water. This buoyancy buys time for their removal from the water.

The first aid provider should stay out of the water and provide flotation from a safe position. The human motivation to help, especially of relatives and friends, exposes the first aid provider to a significant danger of drowning that can cause death (Franklin & Pearn, 2010). Their primary focus should be on maintaining their own safety.

Flotation can be provided by reaching out to the person with an object (e.g. a pole, tree branch, or towel) or by throwing something that floats (e.g. a buoy, floating boxes, life-jacket or anything else that floats).

In situations where the first aid provider is already in the water (such as on a surfboard or kayak) and has appropriate characteristics (good aquatic competence and experience, physical fitness) and some type of flotation aid, they may attempt a rescue before calling for help.

Remove from the water

The best way to remove a person will depend on the situation including the condition of the person needing rescue, available equipment, type and accessibility of the water body and availability of other bystanders.

The first aid provider could pull the person to land or a boat using rescue equipment such as a pole, rope or flotation aid and then pull the person out of the water.

If the person cannot be reached with rescue equipment a water vessel or equipment (such as a boat, jet ski, surfboard, canoe or kayak) could be used to reach the person.

Swimming to reach the drowning person is associated with high levels of danger for the first aid provider, regardless if they are trained or untrained. Whenever possible, this should be avoided. However, if the situation develops in such a way that swimming to the drowning person is necessary, the rescuer should take a flotation aid.

If the drowning person is responsive they are likely to panic and may pull or grab onto any person or thing approaching them. For this reason, it is important to always provide flotation to the drowning person and use a flotation aid to protect yourself.

If the person is unresponsive, the same principles apply in that the first aid provider should protect their own safety and could attempt rescue using a boat or water sports equipment (canoe, kayak, stand up paddleboard, surfboard, etc.).

Provide care

Once the person has been removed from the water and is on land or a boat, check for a response, open their airway and check for breathing. Treat the person according to their condition.

Responsive and breathing

1. Help the person to rest in a comfortable position, preferably sitting or lying on their side.
2. Carry out further assessment of their condition.
3. Keep the person warm by covering them with dry clothing and protecting them from the cold ground.
4. Monitor the person closely in case the person develops breathing difficulties.

CAUTION

- Breathing difficulties can develop, so if possible, advise that someone stays with the person to monitor their condition for around eight hours.
- If the person is experiencing breathing difficulties or coughing a lot, access medical care.

Unresponsive and breathing normally

1. Move the person onto their side in a recovery position (or into a neutral position if it is a baby) to maintain an open airway and help fluids drain. A baby can be held in this position in your arms. See unresponsive and breathing normally.
2. Access advanced medical care and follow their instructions.
3. Keep the person warm by covering them with dry clothing and protecting them from the cold ground.

4. Monitor the person closely as their condition may deteriorate rapidly. The person may vomit or their breathing may worsen.

Unresponsive and abnormal breathing

In this context, examples of unresponsive and abnormal breathing include taking irregular or noisy breaths, or the person has stopped breathing altogether.

1. Immediately shout for help and ask bystanders to access EMS. If you are alone, access EMS yourself, either using a telephone with the speaker function or–if there is no phone available nearby–leave the person to access EMS. Do this as quickly as possible.
2. Open the person's airway and give two to five initial rescue breaths. Blow steadily for one second until you see their chest or abdomen rise.
3. Initiate CPR.

- The person is likely to vomit. Be prepared to roll them onto their side to clear their airway.
- While performing CPR, be alert to any signs of life such as movement or coughing. If you see any signs of life, pause CPR for up to ten seconds to see if the person can breathe on their own.
- If you are unwilling or unable to give rescue breaths, give chest-compression-only CPR at a rate of 100–120 compressions per minute.
- If an automated external defibrillator is available, ask a bystander to bring it as quickly as possible. Dry the person's skin where the pads will be applied, and follow the voice prompts of the defibrillator.
- Always access medical care for someone who has experienced a drowning incident and received CPR.

Education considerations

Context considerations

- Examine local health or accident data to work out which populations are most at risk of drowning in your region, for example young children, adolescents, or perhaps those with an underlying health condition or in a certain sociodemographic.
- Ensure an adequate risk assessment is carried out in advance of outdoor education activities. Draw up and apply a safety plan based on the risk assessment. The plan should include clear criteria for when to stop the educational activity because of risks or threats to learner safety, such as lightning if outdoors, or an inadequate number of supervisors or lifeguards if near water. Evaluate the plan after the session.
- Using a mixture of both context-based learning (on a beach, poolside, lakeside, etc.) and more formal learning environments (online, a classroom, etc.) can be useful and complementary, allowing flexibility (e.g. for poor weather or accessibility). Some water competencies or elements of them are well suited to more formal environments either online or in-person.
- Teaching water competencies in a relevant context allows learners to experience the local hazards and learn how to deal with risks in a realistic environment, for example, children discovering their beach or public pool or communities experiencing the dangers of the local pond or waterway. Learners should practise rescue techniques from a safe location.

- Prepare adaptable education sessions that can accommodate sudden changes in weather and water conditions. Teach learners to be aware of changing weather conditions, including fast moving or changing tides, and how to recognize and respond urgently to such changes to avoid increased risk of drowning.

Learner considerations

- Learning rescue techniques is encouraged from school age, and knowledge and skills should continue to be refreshed and practised throughout a person's life if these skills are to be retained.
- Adjust the focus of education depending on the learner group. For example, education to caregivers who live near to water could focus on prevention strategies, rescue and CPR, while education to children may focus on self-rescue skills and providing flotation.
- Consider that some people with underlying health conditions (epilepsy, heart problems or autism) may be more at risk of drowning (Denny et al., 2019).
- Change caregivers' attitudes about the value of supervision by using context-specific examples.
- Some learner groups believe myths related to drowning so take time to sensitively dispel the myths and construct accurate knowledge. One common myth is that water is an airway obstruction you have to remove from the person (e.g. by swinging the person around by their legs, hanging them upside down or doing abdominal thrusts). In fact, there is no evidence that water acts as an obstruction. Rescue breaths and chest compressions can be started on an unresponsive person who is not breathing without delay.

Facilitation tips

- Education on this topic should help the learner to understand the drowning process and the importance of rescue breaths during CPR. Airway management skills should also be included.
- When appropriate, consider providing water safety messages as part of a broader practical programme aimed at developing water competence. Evaluate the programme to determine its effectiveness.
- Design programmes using behaviour change models, clearly identifying the risk factors you are trying to reduce.
- Design programmes with consideration of the local water hazards (including fast-changing weather conditions or tides) and cultural considerations such as myths that may affect behaviour change.
- Deliver water safety sessions using educators who can culturally identify with learners as this may make education more effective.
- Use hands-on (experiential) learning when and where safe to do so. Give active opportunities to learners to practise how to develop competencies such as throwing a flotation aid.
- Discuss and assess drowning risks in the home (in the bathtub, buckets of water, etc.).
- Ensure water safety messages are simple and visually engaging.
- Emphasize to learners that the motivation to go to a person in distress, especially of relatives and friends, exposes the first aid provider to a significant danger of drowning

that can lead to death. The rescue should be provided at the lowest risk to the first aid provider. Flotation is essential to any water rescue.
- Practise safely throwing floatation devices (such as life jackets) or using locally available objects such as long tree branches to pull a person to shore. Education could include the use of improvised and purpose-made rescue equipment and should be repeated regularly.
- Where you are using a rescue device, discuss the dangers of the device such as the rescuer being pulled into the water, and how to avoid this happening.
- Emphasize that rescue breaths are the most important initial treatment to restore oxygen in the body and stop the drowning injury. Rescue breathing should begin as soon as possible (i.e. when the first aid provider reaches a safe place with a stable surface). Concerns of water in the airways should not delay rescue breaths. The rescue breaths will push any water in the airways down into the lungs.

Facilitation tools

- Consider using media learning as part of a multi-approach to inform people of the risks, safe behaviours and how to access help.
- Use the Water Competencies checklist found in the Education review section of this topic to ensure you include physical, cognitive and attitudinal elements to provide a holistic approach to water safety education.

Learning connections

- Highlight and practise the connections to the Unresponsive abnormal breathing topics for baby and child or adolescent and adult, raising awareness of the importance of rescue breaths combined with chest compressions for people who are not breathing as a result of drowning (as opposed to chest-compression-only CPR).
- A person who has been in the water may be at risk of Hypothermia.
- If relevant, pair this topic with other aquatic topics such as Decompression illness or Aquatic animal injuries.
- Consider any relevant education practice in the topics such, as mass social media for education and online and blended learning.
- Consider pairing water competency education with environmental or WASH (water, sanitation and hygiene) issues.
- Care for the person's mental distress, see traumatic event.

Scientific foundation

Systematic reviews

Recognition of drowning by a lay person

A systematic review on the recognition of drowning, including the visual cues or signs a lay person can use to identify a drowning person, was conducted and 23 studies were identified (Pascual-Gomez & Petrass, 2020). The review highlights that there is very limited empirical data describing how lay people recognize a person in the early stages of the drowning process. The review therefore also draws on limited data describing how lifeguards recognize drowning.

One study found that lifeguards are commonly taught to look for a specific set of behaviours that are considered to show drowning or distress, including splashing, frequent submersion, changes in body position, impairment of swimming effectiveness and a lack of progress through the water.

Another study found that given the drowning person's rapid progression from distress to submersion, recognition of even earlier signs of distress is critical, for example, a swimmer moving slowly due to weakness, physical condition or fatigue or moving into water beyond their skill level.

A separate study found that lay people were especially good at identifying even earlier events that can lead to drowning, for example, children performing dangerous activities, such as repeated submerging, horseplay or going too far from shore. Lay people need to be educated on behaviours that characterize distress in the water or drowning. Results indicate that a person shows some or all of the above behaviours in almost all instances of drowning. However, as these behaviours are common in water settings, it may be challenging for bystanders to recognize them. No studies reviewed addressed the fact that some drowning people display no signs. The review made recommendations based on the very-limited and limited evidence available as well as based on best practice and consensus expert opinion.

No new systematic reviews or relevant articles on the recognition of drowning were identified from 2021 onward.

Water rescue equipment

A scientific review addressing the most effective types of aquatic rescue equipment for a lay person or bystander to use to rescue a drowning person was updated in 2019 (Beale-Tawfeeq, 2019). It reported a lack of evidence identifying which items can be recommended based on accuracy, buoyancy, the distance that they can be thrown and ease with which they can be caught by the drowning person. Despite the limited data, the review puts forward the current recommendation of rescue equipment including throw ropes and lines and ring buoys for effective use by bystanders as this seems to contribute to positive outcomes.

No new systematic reviews on water rescue equipment for a lay person were identified from 2021 onward.

Interventions for resuscitation following drowning

The International Liaison Committee on Resuscitation (ILCOR) Basic Life Support Task Force, in collaboration with drowning researchers from around the world, carried out a scoping review on resuscitation and emergency care in drowning (Bierens et al., 2021). This was followed by a systematic review in 2023 (Bierens et al., 2023). Both reviews looked for evidence relating to adults and children who had sustained a cardiac arrest following drowning. The following interventions performed by lay people were examined in these two reviews: (1) bystander CPR; (2) in-water resuscitation versus waiting until arriving on land; (3) resuscitation on a boat versus waiting until arriving on land; (4) compression first (CAB) versus ventilation first (ABC) strategy; (5) compression-only CPR versus standard CPR (compressions and ventilations); (6) use of an automated external defibrillator first versus cardiopulmonary resuscitation (CPR) first.

Furthermore, evidence regarding oxygen administration before arrival at the hospital (7) was analysed. This intervention is intended for trained responders.

Bystander CPR

The scoping review by Bierens et al. (2021) included 65 studies, and identified 19 observational studies that discussed bystander CPR as an intervention following drowning. Statistically significant associations were found with improved neurological outcomes (two studies) and survival (four studies). However, other studies found either a positive trend towards survival or no association. Three studies compared compression-only CPR with conventional CPR and all favoured conventional CPR with bystander ventilation in terms of neurological outcomes and survival.

Based on this evidence, the recommendation is to start conventional CPR which includes rescue breaths.

In-water resuscitation

Immediate in-water resuscitation is defined as delivering ventilations only to a non-breathing person who is still in the water.

Five studies were identified by the ILCOR scoping review on the topic of in-water resuscitation (Bierens et al., 2021). The evidence indicates that in-water resuscitation (composed of rescue breaths only) is very challenging and should only be attempted by highly-trained rescuers if it is safe to do so. Therefore, the emphasis for first aid providers should be on non-contact rescue rather than in-water resuscitation.

One clinical study used a protocol of giving rescue breaths for up to one minute before moving the unresponsive person to shore; in deep water, either the availability of a flotation aid or at least two rescuers were required. Initial survival, survival to hospital discharge and favourable neurological outcomes were all rated higher for in-water resuscitation. The other four studies evaluated the capacity of lifeguards and lay people to perform in-water resuscitation and rescue of a mannequin. In-water resuscitation was technically difficult and physically demanding, particularly in open water. It increased the rescue time, number of submersions and breathing in of water by the mannequin. Some trained lifeguards and lay people were unable to complete the rescue. ILCOR found that the use of ventilation adjuncts by well-trained lifeguards might facilitate in-water resuscitation.

Neither a systematic review from 2023 (Bierens et al.), nor an ILCOR evidence update conducted in 2024 identified any further relevant and sufficiently reliable studies on this topic.

Resuscitation on a boat

The ILCOR scoping review (Bierens et al., 2021). found seven studies that evaluated resuscitation on a boat. One case series looked at the outcome of survival from resuscitation on a boat (24 cases) and found no survivors. However, the CPR quality was reported to be sub-optimal. In the other case series, six resuscitations were attempted on a boat or lifeboat and there was only one survivor after one month. Four studies evaluated the capacity of lifeguards and fishermen to perform CPR in inflatable rescue boats or fishing boats. The studies showed that CPR was physically demanding but that resuscitation on a boat was feasible. The quality of the

resuscitation was affected by the boat speed and the sea conditions with ventilations more affected than chest compressions. One simulation study showed that defibrillator use on rigid inflatable rescue boats on calm water was feasible.

In the ILCOR systematic review in 2023 (Bierens et al., 2023) no studies were identified which directly compared starting resuscitation on a boat with delaying resuscitation until arrival on land. On-boat CPR may be delivered if rescuers trained in this technique determine that it is feasible and safe to attempt resuscitation. If the rescuers feel that the application of immediate CPR is or becomes too difficult or unsafe, then the rescuers may delay resuscitation until on land.

Ventilation- or compression-first strategy

Cardiac arrest following drowning is usually the result of severe hypoxaemia. It is therefore important to discuss whether resuscitation in this context should be started as usual with compressions first (CAB) or with ventilation first (ABC).

In the 2023 ILCOR systematic review (Bierens et al. 2023), no studies were identified which directly compared a compression first strategy with a ventilation first strategy during the resuscitation of patients with cardiac arrest following drowning. Nevertheless, ILCOR (2025) recommends that, as a good practice point, healthcare professionals and those with a duty to respond to drowning (e.g. lifeguards) should consider providing rescue breaths/ventilation first (A-B-C) before chest compressions if they have been trained to do so. No direct or indirect evidence is available to support any certain number of initial ventilations if lifeguards or healthcare professionals adopt a ventilation-first strategy. Most importantly, resuscitation should not be delayed, regardless of the strategy (Bray et al., n.d.)

Compression-only CPR versus standard CPR

In the 2023 ILCOR systematic review (Bierens et al., 2023), two observational studies were identified that compared compression-only CPR with standard CPR (ventilation and compression) during the resuscitation of patients with cardiac arrest following drowning. Both studies compared the impact of both strategies on the return of spontaneous circulation (ROSC) and a favorable neurological outcome. The results indicate that standard CPR leads to better outcomes than compression-only CPR. The evidence is of very low certainty of evidence due to wide confidence intervals and serious risks of bias.

Automated external defibrillator use in drowning

The ILCOR scoping review (Bierens et al., 2021) searched for studies reporting the impact on outcomes after the use of an on-site automated external defibrillator (defibrillator) in cardiac arrest due to drowning prior to the arrival of EMS but no studies were identified.

Indirect evidence of defibrillator use was found from 15 observational studies. In four studies there was a range of defibrillator use in cases of suspected drowning prior to the arrival of EMS. In 12 studies it was uncommon to detect a shockable rhythm. Seven observational studies found that a shockable rhythm was not associated with the outcome of better survival. One study found there was an association between shockable rhythm and increased 30-day survival. One study found the use of defibrillators on boats feasible during moderate sea conditions. One

study with lifeguards reported the mean time from arrival to defibrillation was 62 seconds. There was one case of inappropriate shock delivered to a person in an asystole in one study, with no obvious consequences. There were no adverse events identified in any of the studies listed.

A systematic review (Bierens et al., 2023) and an evidence update (Bray et al., n.d.) did not identify any relevant new studies on this topic.

Oxygen use

The ILCOR scoping review also searched for studies about the pre-hospital use of oxygen following a submersion incident, but no studies were identified (Bierens et al., 2021). Indirect evidence from observational studies found associations between hypoxia, oxygen administration and worse outcomes. In the absence of specific research about the use of oxygen in drowning, ILCOR concluded that the existing treatment recommendation for oxygenation after the return of spontaneous breathing applies. This means, when using 100% inspired oxygen, waiting until arterial oxygen saturation or the partial pressure of arterial oxygen can be measured to avoid hypoxaemia and hyperoxia. If the person who has drowned is breathing normally, supplemental oxygen with a target saturation of 94–98% may be used.

In a systematic review (Bierens et al., 2023) and an evidence update (Bray et al., n.d.), no new studies were identified that directly compared the oxygen prior to hospital arrival with not using oxygen.

Non-systematic reviews

Water rescue equipment

The scientific review outlined above by Beale-Tawfeeq (2019) addressing the most effective types of aquatic rescue equipment for a lay person or bystander to use to rescue a drowning person also recorded some expert opinion. Experts recommended that teaching rescue skills should become a part of water safety classes and guidelines to reduce drowning rates. They also recommended that targeted interventions are needed to address rescue skills in multiple aquatic environments, particularly those that are high risk. Additionally, experts recommended that the development of public-access safety programmes may help improve drowning outcomes.

Finally, the review also reflected on the sentiment of “rescuer altruism” in a lay person or bystander when a person needs rescue from the water; they will initiate rescue despite the danger to themselves.

Lay rescuer techniques in drowning incidents

A scoping review (Barcala-Furelos et al., 2021) to identify the safest techniques and equipment for an untrained bystander to use when attempting a water rescue included 22 studies. The review identified three types of techniques used by laypersons:

- non-contact techniques for rescue out the water: throw and reach
- non-contact techniques for in-water rescue: flotation aids
- contact techniques for rescue in the water: swim and tow with or without flippers.

The review stated that the safest technique for a lay rescuer is the first option: to attempt a non-contact rescue using a pole, rope or flotation equipment without entering the water.

Despite the recommendation that an untrained person should not enter the water to rescue a drowning person, the literature shows a human tendency towards "altruism" in helping a drowning person. In most incidents, a rescuer entered the water and made contact with the drowning person, putting themselves at risk. This behaviour was especially manifested when the rescuer had a close bond with the drowning person. However, in many cases, witnesses took risks to help someone they did not know, based on the principles of the Good Samaritan and the desire to "do the right thing".

The review suggests it may be difficult to prevent the impulse of lay rescuers to enter the water but it is possible to encourage potential rescuers to carry some sort of flotation aid if they attempt a rescue. Studies in the review identified that the teaching of rescue techniques in school should be ongoing if the skills are to be retained in adult life.

Removal of fluid

There is no indication that water blocks the airway as a foreign body. Manoeuvres such as abdominal thrusts to relieve foreign body airway obstruction are therefore not recommended for people who have drowned (International Life Saving Federation, 2016). Such manoeuvres are unnecessary and may cause injury or vomiting and delay CPR. Resuscitation with rescue breaths should begin immediately rather than attempting to remove fluids from the airways.

Little fluid–if any–can be removed from the airways by drainage techniques (suctioning, abdominal thrusts or postural drainage). This is because the estimated amount of water breathed in is small and, after just a few minutes of submersion, it is absorbed into the circulation (Golden et al., 1997). However, autopsy studies show large amounts of swallowed water in the stomach. Therefore procedures for foreign body airway obstruction should be used only if the airway is completely obstructed by a solid object.

Positioning of an unresponsive person who is breathing

Szpilman (2012) recommends placing the breathing person on their side in the recovery position, with their head positioned to allow free drainage of fluids. The position should be stable, without pressure on the chest.

Spinal injury in instances of drowning

A person who is drowning is at risk for a spinal injury only if they have also sustained a traumatic injury or been involved in a high impact activity (such as diving, water skiing, surfing or being caught in moderate to severe surf breaks). Routine spinal immobilization does not appear to be warranted solely on the basis of a history of submersion (R. S. Watson et al., 2001).

The International Life Saving Federation (2016) recommends that in the case of drowning as a result of a traumatic injury, if the person is unresponsive, management of their airway takes priority over any suspected spinal injury. The person can be handled to minimize spinal movement if possible. If the person is responsive, the principles of minimizing movement apply and if removal from the water is necessary, then it should be done while maintaining alignment of the spine.

Education review

Prevention of drowning

A paper by Denny et al. (2019) summarized factors that contribute to the incidence of drowning in the US and then made recommendations to prevent drowning. These strategies to prevent drowning are particularly relevant to education and advocacy.

Factors that contribute to drowning in the US included the populations of young children ages zero to four due to unsupervised access to bodies of water and adolescents who may overestimate their water competencies, undertake risky behaviour or may be affected by alcohol. Underlying health conditions such as epilepsy, cardiac arrhythmia and autism also increase the risk of drowning. Socio-demographics are also a contributing factor.

The paper outlined that learning to swim is just one part of water competency. To prevent drowning, Denny et al. recommended that people need broader water competencies including knowledge of local hazards, understanding of one's limitations, ability to put on a life jacket and all the first aid related to drowning (recognition, rescue, etc.). Developing these skills takes time and developmental maturity. The paper highlighted some existing drowning prevention strategies such as the Haddon Matrix and ranks five major interventions as evidence-based: four-sided pool fencing, life jackets, swim lessons, supervision and lifeguards.

Denny et al. went on to identify the role of parents, medical providers, pool operators and policymakers in being informed of and promoting drowning prevention recommendations and legislation. The paper identified the most evidence-based interventions as being four-sided pool fencing, life jacket use, swim lessons, supervision and lifeguards and bystander CPR.

The World Health Organization's (WHO) "Drowning Prevention: an implementation guide" (2017) also formed much of the foundation for the prevention content. The paper provides practical steps to preventing drowning. Later, in 2022, the organization also published its "Practical guidance for the provision of day-care, basic swimming and water safety skills, and safe rescue and resuscitation training". Two systematic reviews formed the basis for this guideline, including one on the impact of day care programmes for children under six years to prevent drowning in low- and middle-income countries (De Buck et al., 2021), and one on basic swimming and water safety skills training for drowning prevention in children, a review that was recently updated (Criel et al., 2025).

Lifeline rescues

Pearn and Franklin (2009) carried out a study with 25 volunteers which tested their ability to throw a lifeline (rope) to a person simulating drowning 10 metres from the shore. The time and accuracy of achieving a successful lifeline throw were recorded for each of multiple attempts. The results indicated that more than half of fit adults cannot throw a lifeline accurately to a distance of 10 metres even with multiple attempts and that, in the heat of the moment, one in five "rescuers" do not anchor the end of the rope, which is then lost when thrown. These results were compared to competitive or trained rescuers who can deploy a lifeline with extreme accuracy and great speed.

The study highlighted the importance of the safety of the rescuer and the use of non-contact rescue to maintain this. However, it emphasized that to be successful in non-contact rescues, people need training and practice in throwing a lifeline or buoy. Pearn and Franklin implied that a person's first time throwing a lifeline should not be in the midst of a life-threatening event.

Water competencies

Stallman et al. (2017) built on previous work to use evidence to select essential water competencies. They argued swimming skills alone are not enough to address drowning prevention; rather a broad range of competencies are required including:

1. safe water entry competence
2. breath control competence
3. stationary surface competence (buoyancy or treading water)
4. water orientation competence
5. propulsion competence (swimming)
6. underwater competence
7. safe exit competence
8. personal flotation device
9. clothed water competence
10. open water competence
11. knowledge of local hazards competence
12. coping with risk competence (awareness, assessment, avoidance)
13. assess personal competence
14. rescue competence (recognize and assist safely)
15. water safety competence (attitudes and values)

In the "aquatic literacy" model, Mekkaoui et al. (2025) combine the concepts of water competencies and physical literacy. The authors define aquatic literacy as follows: "A dynamic state of individual aquatic education that enables lifelong voluntary and safe engagement in a wide range of aquatic physical activity opportunities, supported by the development of preservation of essential motor, psycho-social and cognitive skills, as well as the overlap between them, related to movement experiences in, on and around water." This work adds a solid theoretical foundation to the prevention content presented in these guidelines.

BREATHING PROBLEMS

Breathing difficulties

Key action

Help the person get into a comfortable position (usually seated).

Introduction

A person with breathing difficulties may complain of tightness in the chest or a feeling of suffocation; they may have very rapid or noisy breathing, or struggle to inhale. Life-threatening causes requiring first aid are Choking, heart failure or an acute episode of a known condition (such as Asthma or chronic obstructive pulmonary disease). Breathing difficulties can also lead to unresponsiveness. Hyperventilation is also a relatively frequent breathing disorder that is usually a consequence of anxiety or being upset and usually passes quickly. In babies and young children, breathing difficulties could also be caused by croup or bronchiolitis.

Guidelines

- People with breathing difficulties may experience relief in a comfortable position, such as a seated position or an arm-bracing position (leaning forward with arms braced and leaning on a support).*
- A person who is hyperventilating may be reassured.*

Good practice points

- First aid providers may assist the person to take their medication if they have any.
- If the person is experiencing severe breathing difficulties, acute chest pain or a change in mental status (such as confusion or drowsiness), the first aid provider should access emergency medical services (EMS), monitor for unresponsiveness and continue to observe and assist the person until help arrives.
- In certain cases, a specially trained first aid provider can give supplementary oxygen.
- If the person's breathing does not improve after 10–15 minutes, medical care should be considered.

Chain of survival behaviours

Prevent and prepare

- Be aware of any conditions, such as asthma or lung disease, that family, friends and coworkers may have, and learn how to help them in the event of an emergency.
- Avoid entering places with poisonous gases or smoke without appropriate breathing equipment.
- Limit strenuous physical activity, particularly for people at risk during episodes of heavy pollution, heatwaves or when pollen is in the air.

Early recognition

Breathing difficulties can be subjective. What may seem severe to one person may not be severe to another. Listen to the person and look for clues in their behaviour and the surrounding environment.

The person may tell you or indicate that they are having difficulty breathing, or that they have a pre-existing medical condition such as asthma or lung disease.

The signs and symptoms a first aid provider may look for to indicate breathing difficulties include:

- shortness of breath
- laboured breathing
- noisy breathing
- coughing
- rapid breathing rate (more than 40 breaths per minute in babies; 30 in children; 20 in adults)
- slow breathing rate (less than 25 breaths per minute in babies; 15 in children; 10 in adults)
- not being able to count to 10 after one deep breath in
- use of accessory muscles for breathing (neck, shoulders)
- movement of the nostrils
- bluish colour to the skin of the lips, ears, fingers and toes.

Hyperventilation is also characterized by other typical signs and symptoms, such as:

- dizziness
- headache
- sweating
- tingling sensation in hands, feet, fingers or mouth.

Be alert as dangerous gases and other substances can cause breathing difficulties for first aid providers and bystanders. Providers should assess the scene. For example, the person may have breathing difficulties due to carbon monoxide poisoning, which occurs during incomplete combustion in an oxygen-poor environment.

Slowed breathing and an altered level of consciousness may be a sign of opioid toxicity.

First aid steps

Breathing difficulties

1. Help the person into a comfortable (usually seated) position and reassure them. They may experience relief by sitting with their arms braced and leaning forward on a support.
2. Assist them in taking their medication if they have any. Loosen any tight clothing.
3. Access EMS immediately if:
    a. their medication is ineffective after a couple of minutes
    b. the person is experiencing severe breathing difficulties
    c. the person has a change in mental status, such as confusion, drowsiness or unresponsiveness

    d. their breathing becomes slow
    e. their lips, fingers or ears turn a bluish colour.
4. If properly trained and access to supplementary oxygen is available, give it to the person as needed.
5. Continue to observe the person, keeping them calm and comfortable. Stay with the person until their breathing returns to normal or EMS arrives.

Hyperventilating

If the person is hyperventilating:

1. Move the person to a quiet place and ask bystanders to provide a calm environment. If possible, remove the cause of the panic attack.
2. Comfort the person and act calmly and predictably. Ask them to breathe in and out slowly and steadily.
3. Loosen any tight clothing.
4. Stay with the person until their breathing returns to normal.

If the person is unresponsive, open their airway and check for breathing. If you suspect opioid toxicity, consider using naloxone.

Access help

- In the case of hyperventilation, access EMS if:
    - the panic attack continues
    - you suspect that it may not be caused by a panic attack.

Recovery

- If this was the person's first episode of breathing difficulties, teach them the signs and symptoms so they can recognize any future episodes sooner. Early recognition helps the person to access any medication earlier, get into a comfortable position sooner, and, if necessary, seek EMS sooner.
- Encourage the person to seek specialized medical care for recurring breathing difficulties.

Education considerations

Context considerations

- Research has identified that both within and between communities, people may treat breathing difficulties differently. Some communities and individuals wait to seek assistance when in a much more advanced phase of illness (Cartledge et al., 2017).
- Tailor education to learners needs according to the environment they are in (e.g. areas of high air pollution), or if there is a particular situation where breathing difficulties might become apparent (such as during a pandemic).
- Non-emergency medical services may be able to treat breathing difficulties that occur slowly and over time. First aid education should include advice about the available options in local health services.

- Highlight relevant context considerations, such as wearing a mask during smog season, the potential aggravation of breathing difficulties by industrial zones, and the additional breathing issues caused by wildfires or pollution.

Learner considerations

- Educators should be mindful of the cultural, gender and age-based factors that may influence learners' understanding of breathing difficulties and severity. Ensure first aid programme content is inclusive.
- Learning about how to recognize and respond to breathing difficulties could benefit carers of older adults who have chronic lung or heart conditions, parents with babies and caregivers of children with asthma.
- Learners who spend time in smoky or dusty environments (such as firefighters or construction workers), or in places where there might be chemicals (such as laboratories, factories or farms), could benefit from learning about breathing difficulties.

Facilitation tips

- Emphasize the importance of listening to the person's breathing to help identify any problems that may worsen and result in a medical emergency. Highlight that breathing can deteriorate over time.
- Revisit what "normal" breathing looks like by counting breathing rates and regularity.
- Ask learners to show how they think someone may look or act when experiencing breathing difficulties.
- Explore learners' understanding of the term "breathing difficulty", as well as the causes and their experience with it. They might have different interpretations that could affect their response and willingness to act. For example, people with a specific type of breathing difficulty called orthopnoea have trouble breathing when they lie down, typically at night, and may not seek assistance if they feel they can resolve the symptom by sitting upright.
- Run scenarios to rehearse recognizing and responding to the typical presentation of various types of breathing difficulties. Assessing the scene for hazards should be a part of the exercise.
- Explain to learners that individuals who are hyperventilating may benefit from adopting a controlled breathing rhythm. Learners should practise setting an example and encouraging someone to follow their breathing rhythm. This may involve counting one to breathe in through the nose and three to breathe out through the mouth.

Facilitator tools

- Use videos to show normal breathing and changes in breathing (e.g. asthma attack), as well as brief clips to demonstrate life-threatening breathing problems.
- Use scenario-based learning to help individuals integrate assessment skills.
- A method of assessing breathing difficulty is to ask the person to take a deep breath and then ask them to count from 1 to 30, clearly but quickly (Roth Score). If the person cannot count to 10, at most, they have breathing difficulties. Give learners time to practise this method.

Learning connections

- Common causes of breathing difficulties include asthma, chronic obstructive lung disease, bronchitis, croup (babies and children) and bronchiolitis (babies and young children).
- Other life-threatening conditions which result in breathing difficulty include choking, heart failure and asthma attack.
- Consider whether it is appropriate for learners to learn about oxygen administration.
- Any stressful situation, including ones where first aid for injuries and illness might be required, could cause some people to panic. Learning how to calm a person who is hyperventilating could be an important part of scene management.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) updated the evidence reviews on shortness of breath and posture, as well as hyperventilation and breathing in a paper bag, but no new studies could be identified.

Shortness of breath and posture

There is limited evidence from three experimental studies in favour of arm bracing and sitting.

A randomized controlled trial showed that arm bracing resulted in a statistically significant decrease in the Borg dyspnoea scale. It was compared to leaning forward while standing or erect standing in people with stable chronic obstructive pulmonary disease experiencing shortness of breath (dyspnoea). A statistically significant increase or decrease in the Borg dyspnoea score or standing erect compared to leaning forward while standing could not be demonstrated. In a second randomized controlled trial, it was shown that a sitting position resulted in a statistically significant decrease in Borg dyspnoea score, compared to lying on the back (supine position). In a third trial, a statistically significant change in Borg dyspnoea score, sitting compared to lying on the back (supine), could not be demonstrated. The evidence is of low certainty.

Hyperventilation and breathing in a paper bag

There is limited evidence from one experimental study in favour of breathing in a paper bag (van den Hout et al., 1988). This study, in which 12 healthy volunteers were instructed to hyperventilate deliberately, showed that breathing in a paper bag resulted in a statistically significant decrease in time to reach baseline CO2 levels and time to symptom disappearance, compared to not breathing in a paper bag. A statistically significant decrease in time to symptom disappearance when breathing in a closed-circuit tube system, compared to an open-circuit tube system, could not be demonstrated.

Cold or humidified air

CEBaP updated the evidence summary on inhaling cold or humidified air in case of shortness of breath in 2024, and identified one randomized and one quasi-randomized controlled trial. In one study, it was shown that steam inhalation, in combination with standard care, resulted in a

statistically significant reduction in respiratory distress after 18 and 24 hours in infants with acute bronchiolitis compared to standard care only in children with bronchiolitis. This was not the case in children with pneumonia. A second study showed that steam inhalation resulted in significantly higher respiratory distress than using nebulized salbutamol in infants with bronchiolitis. No difference was found compared to nebulized saline (placebo). Therefore, steam inhalation seems to have a positive effect on respiratory problems, but only when used with other treatment modalities.

Choking

Key action

Dislodge the obstruction in the person's throat so they can breathe.

Introduction

Choking occurs when the airway is partially or completely blocked by a foreign body, such as a piece of food or an object (a magnet or small toy). Choking is also referred to as a foreign body airway obstruction and is a common cause of breathing emergencies, especially in young children. Deaths related to choking underline the importance of preventive and first aid measures. It is one of the most common life-threatening emergencies seen by first aid providers. The technique used to help someone who is choking depends on the person's age, size and level of responsiveness.

In this topic, a baby refers to someone who is less than one year old. A child refers to someone who is one year or older.

Guidelines

- Immediately after recognition, bystanders can carry out interventions to support the removal of a foreign body airway obstruction.*
- Back blows may be used initially on adults and children with a foreign body airway obstruction and an ineffective cough.*
- Abdominal thrusts may be used on adults and children with a foreign body airway obstruction and an ineffective cough where back blows are ineffective.*
- First aid providers may consider the manual extraction of visible items in the mouth.*
- First aid providers should use standard CPR, consisting of both chest compressions and rescue breaths if possible, on an unresponsive person with a foreign body airway obstruction.*

Good practice points

- When helping a responsive person, first aid providers must be able to recognize the signs of partial airway obstruction (e.g. the person can speak, cough and breathe) and complete airway obstruction (the person is unable to speak, has a weakened cough and has difficulty breathing).
- A person with partial airway obstruction should be monitored until they improve, as it could develop into a complete airway obstruction.
- Back blows and abdominal thrusts or chest thrusts should be applied in quick succession until the obstruction has been cleared from the airway.
- Responsive babies may receive a combination of back blows followed by chest thrusts to clear the obstruction from the airway.
- In responsive adults and children who are choking, chest thrusts, back blows or abdominal thrusts are equally effective.

- In infants who are choking, chest compressions with thumbs/hands in a circle, two fingers or the palm of one hand are equally effective.
- An unresponsive baby should receive a combination of rescue breaths and chest compressions to clear the obstruction from the airway.
- Chest thrusts may be used in unconscious adults and children with a foreign-body airway obstruction.
- First aid providers should not use a blind finger sweep in people with a foreign-body airway obstruction as this may push the object further down the person's airway.
- First aid providers should not routinely use a suction-based airway clearance device to remove a foreign-body airway obstruction.

Chain of survival behaviours

Prevent and prepare

- Understand the difference between partial or complete choking and Asthma attack, Allergic reaction and anaphylaxis and other conditions that may cause sudden breathing difficulties.
- Be aware when people are eating as this is usually when choking occurs.
- Monitor a baby who is eating or might put something in their mouth.
- Be aware that people who have reduced responsiveness, a neurological impairment that affects their swallowing and coughing reflexes (e.g. stroke, Parkinson's disease, cerebral palsy or dementia) or respiratory disease are at an increased risk of choking. People are also at a higher risk if they are intoxicated (due to substances or alcohol), if their teeth are in poor condition or if they are an older adult.

Early recognition

The person may have had something in their mouth, such as food. Ask the person: "Are you choking?"

Partial airway obstruction:

- weak or forceful coughing
- can speak or cry out
- makes high-pitched noises while inhaling, but is still able to breathe

Complete airway obstruction:

- unable to cough, speak, cry or breathe
- clutches the throat with one or both hands
- panic
- bluish colour to the skin of the lips, ears, fingers and toes
- becomes unresponsive if the blockage is not removed

First aid steps

Adults and children

Partial airway obstruction

1. Encourage the person to cough to clear the blockage.
2. Monitor the person until they improve, as it could develop into a complete airway obstruction.

Complete airway obstruction

1. If the person cannot cough, speak or breathe, give up to five firm blows between their shoulder blades.
2. If the back blows are unsuccessful, give up to five abdominal thrusts by putting your fist between their ribs and their belly button and pulling it sharply inward and upward using the other hand.
3. If the abdominal thrusts are unsuccessful, immediately access emergency medical services (EMS).
4. Continue alternating between five back blows and five abdominal thrusts until the blockage clears or the person becomes unresponsive.

If the person has partial airway obstruction, avoid taking action as they may be able to clear the airway more effectively on their own. Consider calling EMS.

If the person becomes unresponsive, give standard CPR.

Only remove solid material in the airway with your fingers if you can see it. Do not blindly sweep the mouth with your fingers.

Babies

Partial airway obstruction

1. If the baby is coughing or crying, wait to see if they can cough to clear their own airway.
2. Monitor the baby until they improve, as it could develop into a complete airway obstruction.

Complete airway obstruction

1. If the baby cannot cough, cry or breathe, give up to five firm blows between their shoulder blades.
2. If the back blows are unsuccessful, turn the baby over and lay them on your knees. Use the two-thumbs encircling technique to perform chest thrusts as advised for chest compressions but compressing the sternum more sharply. Repeat up to five times or until the obstruction is cleared.
3. If the chest thrusts are unsuccessful, access EMS immediately.
4. Continue alternating between five back blows and five chest thrusts until the blockage clears or the baby becomes unresponsive.

If the baby becomes unresponsive, start standard CPR.

Only remove solid material in the airway with your fingers if you can see it. Do not blindly sweep the mouth with your fingers.

Access help

- In the case of complete airway obstruction, always access EMS. The person may have internal injuries from the abdominal thrusts, or the object may have caused some damage to their airway. Even if they are no longer choking, they may have a piece of the object in their lungs that can later cause complications.
- In the case of partial airway obstruction, the person should seek medical care if they continuously cough, experience difficulty swallowing or feel as though the object is still stuck in their throat.

Education considerations

Context considerations

- Consider which contexts learners are most likely to encounter choking and if there are specific signs to which they should be more alert. For example, those working with older adults at an assisted living residence should recognize what it looks like to choke. Conversely, the signs of choking present differently in babies so learners caring for this age group will need to be aware of those signs.
- Because choking often happens while eating, a choking emergency could happen in a public place. Programme designers may consider framing this as a "helping behaviour" topic as it is one where the bystander effect could result in people feeling uncomfortable to step forward and help. Emphasize the first step as asking the person if they are choking.
- In babies and children, reported cases of choking occur while eating or playing with non-food items such as coins or small toys. Learners should explore ways to reduce the risk of babies and children putting objects in their mouths; for example, place small items out of reach.
- Recommendations for treatment can vary across regions. Some recommendations use chest thrusts applied with two thumbs on the breastbone, while others prefer chest thrusts using the heel of one hand. If the infant becomes unconscious, some guidance recommends starting with five ventilations, while other guidance recommends beginning CPR with chest compressions. Across all guidance, there is agreement that evidence is insufficient to support the use of suction devices.

Learner considerations

- Some babies experience partial airway obstruction frequently when they are learning to eat solids. While usually not serious, the experience can be very distressing for caregivers. Include an opportunity for caregivers to share their fears and their experiences as a way of building confidence to help babies effectively.

- Learning to give back blows can be challenging as it is not possible to practise this on another person for fear of hurting them. Stress that a gentle slap will not expel the object stuck in someone's throat; force is needed to dislodge the object, even if this might hurt the person.
- If the learners are likely to need to help a pregnant or obese person with choking, see the Facilitating choking skills resource for an adaptation for abdominal thrusts.

Facilitation tips

- Focus choking education on the prevention and first aid domains within the chain of survival behaviours.
- Explain why it is important to do the different actions on someone who is choking. Back blows create a strong vibration and pressure in the airway while abdominal thrusts and chest thrusts squeeze the air out of the lungs, creating additional pressure in the airway. These techniques may dislodge the object and help the person to breathe again.
- Explore how using gravity (by bending over or holding the baby's head lower than the body) can help dislodge the foreign object or liquids drain out.
- Learners practising back blows and chest thrusts for a choking baby should sit or kneel. Although it can be easy to hold a mannequin baby in one arm (straddle arm technique), it can be more challenging with a real baby, especially for younger learners. Supporting the baby on their lap can be more effective and safer (Gesicki & Longmore, 2019).
- Explain that learners should not use abdominal thrusts for babies as their organs are still developing and may get damaged.
- While facilitators may include participants in demonstrating how to position oneself to give back blows and abdominal or chest thrusts, the real actions should be demonstrated on a mannequin.
- If teaching children or demonstrating for a child, the facilitator should go on their knees at the child's height to demonstrate back blows and abdominal thrusts.
- Explore and address any misconceptions about choking, such as giving the person a drink to clear the blockage or hanging a baby upside down.

Facilitation tools

- Use videos or demonstrations to help learners understand how to do back blows, chest thrusts or abdominal thrusts. Emphasize that while these actions may seem aggressive, they could save the person's life. Explain that learners should adapt the force of their actions depending on the size of the person, but that those actions still need to be forceful enough to clear the airway.
- In addition to mannequins, use objects such as punching bags or stuffed sacks to practise back blows and abdominal or chest thrusts.
- Develop scenarios to practise recognizing and helping someone who is choking. These scenarios may be used to assess learners' knowledge and skills on this topic.

Learning connections

- If someone who is choking becomes unresponsive, it is necessary to start CPR as the chest compressions or rescue breaths may dislodge the object from their airway and help

them to breathe again. See Unresponsive and abnormal breathing adolescent and adult or baby and child.

Scientific foundation

The International Liaison Committee on Resuscitation (ILCOR) conducted a systematic review on foreign body airway obstruction (FBAO) in 2020 (Olasveengen et al., 2020a; Olasveengen et al., 2020b), which primarily included case series and observational studies and found very low–certainty evidence for all commonly used interventions. Since then, this topic has been transferred from the Basic Life Support (BLS) Task Force to the First Aid (FA) Task Force (2023), reflecting its relevance to lay first aid providers. An Evidence Update published in 2025 identified 17 new publications (August 2019–September 2024) but did not fundamentally change the certainty of evidence, which remains very low (Djärv et al., 2025a; Djärv et al., 2025b).

Back blows

Earlier evidence (2020) reported survival and relief of obstruction in all treated individuals across several case series, with a small number of reported injuries or complications. The 2025 Evidence Update confirms that back blows remain effective and commonly successful, and one newer study suggests they may be more effective than chest or abdominal thrusts. Overall certainty remains very low because of serious risk of bias and indirectness, but back blows are still considered an appropriate initial intervention.

In a cohort study of bystanders caring for FBAO (Bieliński et al.,2024; Dunne et al., 2024), relief of FBAO occurred in 492 of 643 (90%) patients with BLS interventions. Back blows demonstrated better outcomes than other interventions. For the important outcome relief of obstruction, abdominal thrusts as a first intervention had an OR of 0.57 (0.39 -0.62) compared to back blows. For the critical outcome of survival to discharge, abdominal thrusts as a first intervention had an OR of 0.20 (0.07 – 0.59) compared to back blows. This is the largest cohort study to date of bystander interventions and supports beginning with back blows.

Abdominal thrusts

In 2020, multiple case series reported successful relief of FBAO, but a substantial number of reports described associated injuries or complications. The 2025 Evidence Update did not materially change this balance: abdominal thrusts remain effective, particularly when back blows fail, but carry a recognized risk of harm. Evidence certainty remains very low.

Chest thrusts / compressions

Previously, limited observational data suggested possible benefits, including in unconscious patients, with a small number of reported complications. The updated evidence continues to support their use primarily in unconscious patients with FBAO. As with other interventions, certainty remains very low because of imprecision and risk of bias.

Finger sweep

The 2020 review found no clear benefit of blind finger sweeps and documented multiple injuries and complications. The 2025 Evidence Update reinforces this conclusion: blind finger sweeps are

associated with harm and no demonstrated benefit. However, manual extraction of visible foreign bodies in the mouth may be considered.

Foreign body airway obstruction removal by bystanders

Both the 2020 review and the 2025 Evidence Update suggest that early bystander intervention is associated with improved outcomes compared with no action, despite very low–certainty evidence. The updated evidence emphasizes that multiple interventions are often required sequentially to achieve relief.

Other

In 2020, evidence on Magill forceps and suction-based airway clearance devices was limited or not summarized. The 2025 Evidence Update notes an increasing prevalence of airway clearance devices but concludes that evidence remains insufficient to make specific treatment recommendations. Use of Magill forceps may be considered by appropriately trained individuals, particularly in out-of-hospital cardiac arrest contexts.

Overall update and implications

The 2025 Evidence Update confirms that, despite additional publications, the certainty of evidence for all FBAO removal techniques remains very low. No single technique has demonstrated clear superiority across all contexts, and it is common for more than one intervention to be required. Current treatment recommendations from 2020 are therefore maintained, with clarification of age ranges and reinforcement of a stepwise approach: early bystander action, initial use of back blows in patients with ineffective cough, escalation to abdominal thrusts in adults and children over one year if needed, avoidance of blind finger sweeps and consideration of chest thrusts in unconscious patients.

Education review

The papers we reviewed raised important considerations for learners, particularly concerning a choking baby. Gesicki and Longmore (2019) compared the length of a standard baby mannequin with the length of adult forearms. Based on data, they found that the traditional straddle-arm technique was not physically possible for many first aid providers and recommended a more supported version with a seated or kneeling first aid provider.

Asthma attack

Key action

Help the person to sit in a comfortable position and ask them to use their inhaler.

Introduction

Asthma is a common chronic illness of the airways in the lungs. It affects both children and adults worldwide. When an attack occurs, the airways in the lungs swell, narrow and produce extra mucus, making it difficult to breathe. The person may also wheeze and cough. A severe asthma attack can be life-threatening. Many people with asthma have been prescribed and can self-administer medication through an inhaler. Immediate first aid can sometimes prevent the person from needing to go to the hospital.

Guidelines

- People with breathing difficulties may experience relief from different body positions, such as a seated position or an arm-bracing tripod position (leaning forward with arms braced and leaning on a support).*
- A first aid provider familiar with the commonly used bronchodilator inhaler devices (inhaler) may assist a person in using that person's inhaler, if local regulations allow.*
- A first aid provider who is specifically trained may administer a bronchodilator at their discretion, if local regulations allow.*
- Fitting a spacer device to an inhaler for medication administration may help improve the person's breathing by maximizing medication administration, especially in children.*

Good practice points

- A person experiencing an asthma attack should be reassured and helped into a comfortable position.
- Loosening any restrictive clothing may help the person breathe more comfortably.
- If the person has no inhaler, the inhaler is ineffective or the person is experiencing severe breathing difficulties (such as a change in mental status or slow and less noisy breathing), the first aid provider should access emergency medical services (EMS). Continue to observe and assist the person until help arrives.
- The first aid provider should move the person away from things that may be triggering the attack, such as smoke or dust.
- Specifically trained first aid providers can provide supplementary oxygen to a person having an asthma attack if local regulations allow this.

Chain of survival behaviours

Prevent and prepare

- People with asthma should regularly take preventive medicine as prescribed by their doctor and learn about how to manage their condition.
- Educating school staff about asthma can be important to ensure children get the right care when they have an asthma attack at school. This should include learning how to lessen the likelihood of frequent and severe asthma attacks in children.

Early recognition

Usually, a person with asthma knows about their condition and may have their inhaler with them. The person may be able to indicate they are having an asthma attack. They are usually found in an upright position, sometimes sitting leaning forward.

The person may experience:

- difficult or laboured breathing accompanied by wheezing and coughing
- shortness of breath, or a feeling of suffocation or tightness in the chest
- rapid breathing and elevated heart rate
- altered mental status, including becoming anxious, confused or unresponsive.

First aid steps

1. Help the person into a comfortable position and reassure them.
2. Help the person to use their inhaler. Loosen any tight clothing.
3. Access EMS immediately if:
    a. the person has no inhaler and the attack lasts for several minutes
    b. the inhaler is ineffective within a few minutes
    c. the person is experiencing severe breathing difficulties
    d. the person's lips, ears, fingers or toes turn a bluish colour
    e. the person has a change in mental status, such as becoming confused or unresponsive
    f. their breathing becomes slow, less noisy, or if the person is getting tired.
4. If properly trained and access to supplementary oxygen is available, give it to the person as needed.
5. Stay with the person and continue to observe them, keeping them calm and comfortable until the attack is over. Support the person in following the directions for additional doses of their prescription while waiting for medical help to arrive.

Local adaptation

- In contexts where inhalers or supplemental oxygen are not readily available, help the person remain calm, for example, by sitting near an open window with access to fresh, clean air.

Access help

Access help if the person's mental state is affected as they may become unresponsive. In a critical case, cardiac arrest may occur, and the person may stop breathing.

Education considerations

Context considerations

- Administration of an inhaler or other medication should be guided by local laws and regulations. First aid educators may need to tailor their education to the specific context.
- In both high- and low-resource settings, a person with asthma may not have an inhaler with them. Allow learners to practise what to do when there is no inhaler available. This may include actions to calm the person or help them breathe more easily, such as loosening clothing and sitting up. You may also move the person away from the trigger causing the asthma attack (such as smoke).
- In areas where EMS services are extremely limited or non-existent, individuals should learn strategies that can help to ease breathing until the attack passes.
- Check legal restrictions that govern the help first aid providers can give and educate within these. If necessary, include these laws in the educational content.

Learner considerations

- Consider whether learners need to understand:
    - how to recognize someone is having an asthma attack
    - how to help someone use an inhaler
    - when and if to repeat the dose of inhaler
    - when and how to use a spacer device
    - how to administer supplementary oxygen.
- There is limited evidence that schoolteachers are under-prepared for asthma attacks and could therefore be identified as an important audience for this topic (Neuharth-Pritchett & Getch, 2001).
- Asthma attacks can be fatal, so working with health promotion teams and local clinics can help assess community members for potential asthma and needed prescriptions.

Facilitation tips

- Spend time exploring how a first aid provider can help calm someone having an asthma attack, as this may help improve their breathing.
- Administration of inhalers by first aid providers requires education in recognition and medication use, depending on the method being used and the availability of equipment.
- Discuss different types of inhalers and other equipment, such as spacers, and how to either administer the inhaler or help a person use it.
- Learners should have the opportunity to practise the steps they would use in helping someone having an attack (Espinoza-Palma et al., 2009).

Scientific foundation

Systematic reviews

Evidence summaries from the Centre for Evidence-based Practice (CEBaP) were drawn upon to develop these guidelines, as well as evidence review work by the International Liaison Committee on Resuscitation (ILCOR).

Posture

An evidence summary from 2019 identified three experimental studies, involving people with chronic obstructive pulmonary disease, obese people with obstructive sleep apnoea or obesity hypoventilation syndrome, and people with chronic heart failure, comparing different positions to relieve dyspnoea. There is limited evidence in favour of arm bracing and sitting. It was shown that arm bracing resulted in a statistically significant decrease in Borg dyspnoea score, compared to leaning forward while standing or erect standing. A statistically significant change in Borg dyspnoea score or standing erect compared to leaning forward while standing could not be demonstrated. It was shown that a sitting position resulted in a statistically significant decrease in the Borg dyspnoea score, compared to lying on the back. A statistically significant increase or decrease in the visual analogue scale dyspnoea score or sitting compared to lying on the back was not demonstrated. The evidence is of low certainty. The summary was updated in 2024 and no new studies were identified.

Cold or humidified air

CEBaP updated the evidence summary on inhaling cold or humidified air in case of shortness of breath in 2024, and identified one randomized and one quasi-randomized controlled trial. In one study, it was shown that steam inhalation, in combination with standard care, resulted in a statistically significant reduction in respiratory distress after 18 and 24 hours in infants with acute bronchiolitis compared to standard care only in children with bronchiolitis. This was not the case in children with pneumonia. A second study showed that steam inhalation resulted in significantly higher respiratory distress than using nebulized salbutamol in infants with bronchiolitis. No difference was found compared to nebulized saline (placebo). Therefore, steam inhalation seems to have a positive effect on respiratory problems, but only when used with other treatment modalities.

Calmly breathing or breathing exercises

The evidence summary on breathing exercises for individuals with asthma or COPD was updated in 2024; however, no new studies were identified.

Bronchodilator inhalers

ILCOR conducted a systematic review on bronchodilator use in 2015, which identified eight randomized controlled trials, two observational studies and one meta-analysis. Two randomized controlled trials showed an improved time to resolution of symptoms (e.g. wheezing, dyspnoea) and six randomized controlled trials and two observational studies showed improved therapeutic endpoints (e.g. oxygenation and ventilation). No studies were identified on the effect on time to resumption of usual activity or on harm to the person. In three randomized controlled

trials and an observational study, a difference in complications could not be shown when using inhalers compared to a placebo. The evidence is of very low certainty and results cannot be considered precise.

In 2022, ILCOR published an evidence update of this topic and identified a systematic review concluding that among children with asthma exacerbations treated in the emergency department, short-acting b-agonists delivered by metered-dose inhaler decrease hospital admissions in younger children and decrease emergency department length of stay in older children (Wyckoff et al., 2022b; Wyckoff et al., 2022c). Based on the evidence update, it was decided not to conduct a full systematic review update.

In 2023, ILCOR published a scoping review about the potential harms of bronchodilator administration, including 13 studies that reported adverse events such as tachycardia, arrhythmias, tremor, dizziness and a decrease in serum potassium concentrations. The treatment recommendation that trained first aid providers assist with the administration of a bronchodilator to individuals with asthma experiencing difficulty breathing remained unaltered.

Inhalers with spacers

A CEBaP evidence summary identified two Cochrane systematic reviews on the use of inhalers with spacers. No new systematic reviews were identified during the 2024 update of the summary.

The first Cochrane systematic review revealed that there is limited evidence from eight randomized controlled trials in favour of using inhalers with spacers for medication administration in children. It was shown that the use of inhalers with spacers resulted in a statistically significant increase in final peak expiratory flow, a 15-minute rise in expiratory flow, a 15-minute rise in forced expiratory volume and a statistically significant decrease in pulse rate and improvement of blood gases, compared to nebulizers. However, no statistically significant decreases in hospital admission, development of tremor, rise in respiratory rate or deterioration of blood gases were demonstrated. Likewise, no statistically significant increases in 30-minute rise in forced expiratory volume and 30-minute rise in peak expiratory flow were demonstrated. For adults, a difference in outcomes using inhalers with spacers compared to nebulizers could not be demonstrated. Evidence is of low certainty, and results cannot be considered precise due to limited sample sizes, low numbers of events and wide confidence intervals.

The second Cochrane systematic review indicated that there is limited evidence from six randomized controlled trials, neither in favour of using home-made spacers nor commercially available spacers for medication administration in children. A statistically significant decrease in hospital admission, clinical score, heart rate or need for additional treatment when using home-made spacers compared to commercially available spacers could not be demonstrated. A statistically significant increase in peak expiratory flow rate or oxygen saturation when using home-made versus commercial spacers could also not be demonstrated. Evidence is of low certainty, and results cannot be considered precise due to limited sample sizes, low numbers of events and wide confidence intervals.

Croup

Key action

Help the child to rest in a comfortable position that allows them to breathe easily.

Introduction

Croup is a breathing difficulty, usually seen in children six years or younger and triggered by a viral infection in the upper airways (larynx). The infection causes the throat and upper airways to swell, which produces a barking cough and makes the child's breathing sound "squeaky" and hoarse. Symptoms often worsen at night or if the child becomes distressed.

Good practice points

- Help the child into a comfortable position that allows for easy breathing (usually sitting).
- Encourage the child to breathe in warm, humidified air, which may help distract them and calm them down.
- If there is significant shortness of breath or the first aid provider is in any doubt, the provider should access emergency medical care.

Chain of survival behaviours

Prevent and prepare

- Caregivers and parents of young children should be aware of croup, including how to recognize it and what to do.

Early recognition

The child may have:

- shortness of breath
- a hoarse cough
- noisy breathing that sounds raspy or squeaky (also called stridor)
- a croaky voice

First aid steps

1. Calmly reassure the child and help them into a comfortable position (usually sitting).
2. Take the child's temperature. If they are running a fever, treat it.
3. If possible, have the child breathe in warm, humidified air (e.g. sit them near a running shower, or lean them over a bowl of hot water). Make sure the water is not too hot to avoid burns.
4. Monitor their breathing and level of response closely. If the episode of croup is severe or persists, access emergency medical care.

A child with croup may find their condition alarming. Remaining calm may help them to be calm and ease their symptoms.

Access help

- If the child is having severe difficulty breathing (they are sitting up, bent forward, mouth open, using other body parts to help them breathe — such as their neck and shoulders — moving their nostrils or a hollow forms at the base of their neck), access emergency medical care immediately. Be aware that symptoms can worsen from mild to severe within a few hours.
- Epiglottitis is a croup-like condition which can cause a small flap in the throat to swell and block the airway. A child with epiglottitis needs urgent medical care. If in any doubt, access medical care.

Recovery

After the first episode of croup, carers of children may recognize the signs of a recurrence more quickly and act accordingly.

Education considerations

Context considerations

- In some contexts, treatment has included putting the child in a steamy bath or encouraging them to inhale the steam. In doing this, there is a risk of burning the child if hot water is used, so this treatment should only be recommended in contexts where it can be done safely.
- Words or expressions to describe the hoarse cough that accompanies croup vary in different countries and regions. Programme designers should base the learning design on the common words used by local learners.

Learner considerations

- Parents and caregivers of young children will benefit from learning about this topic.

Facilitation tips

- Talk about the different words that may be used to describe the sounds of coughing and breathing during an episode of croup (e.g. barking cough, hoarse, squeaky, stridor). Create a glossary to make sure learners understand what these words mean.
- Use audio clips to help learners identify the specific kind of cough that accompanies croup.
- Many parents have experienced croup, so using storytelling, scenario-based learning and sharing experiences can be reassuring and useful to learn about this topic (Hartling et al., 2010; Luckie et al., 2018).
- Emphasize the importance of seeking medical advice if the condition does not subside.
- Learners may like to see a simple diagram of the upper and lower airways to understand the mechanics of what is happening in the body during an episode of croup.

- Talk about how learners can create a safe, warm, humidified environment and the dangers of using water that is too hot.

Facilitation tools

- Some facilitators use the acronym CRY to support education on croup (or learners could make up their own that they find easy to remember):
    - C: cough and cry in a hoarse voice
    - R: respiratory distress (shortness of breath)
    - Y: young child

Learning connections

- Recognize differences between other conditions like stridor, Choking, sore throat, Breathing difficulties and Asthma attacks. Use a diagram to show the relationship between the upper airways, mouth and food pipe.
- Link to the risk of Burns if the method to create humidity uses water that is too hot.

Scientific foundation

Humidified air

While humidified air or steam is a well-known treatment for children with croup, there is not much evidence to support it. An evidence review from the Centre for Evidence-Based Practice (CEBaP) contains a systematic review and a randomized controlled trial, and no additional studies were identified in the 2024 update. The review found that using humidified air did not clearly improve outcomes for children with croup—such as heart rate, breathing rate, croup score, hospital admissions or oxygen levels—when compared to no treatment or a placebo. However, when humidified air was delivered in an optimal way, it did lead to a statistically significant reduction in heart rate and breathing rate compared to traditional placebo delivery. The evidence is of low certainty due to the risk of bias and imprecision.

Position

CEBaP identified very low-certainty evidence from one systematic review stating that a front-lying (prone) position resulted in a statistically significant decrease in the number of episodes with oxygen saturation levels lower than 80%, oxygenation index (from the 6th to the 12th-hour measurement) and tidal volume, compared to lying on the back (supine). These results were all obtained in crossover trials.

A statistically significant difference in arterial oxygen saturation, partial pressure of carbon dioxide, arterial partial pressure of oxygen, respiratory compliance, positive end-expiratory pressure, respiratory resistance or adverse events between lying on the front (prone position) and lying on the back could not be demonstrated. Additionally, the evidence is indirect, as most of the studies were conducted in hospital settings, involved premature infants and included participants who were intubated during the study.

Hot drinks

CEBaP did not identify any studies on the effect of hot drinks on croup.

TRAUMA

Severe bleeding

Key action

Apply direct pressure to the area to control the bleeding as quickly as possible.

Introduction

Severe external bleeding is a life-threatening condition requiring urgent first aid. The human body relies on blood circulating around the body to deliver oxygen and glucose to organs and tissues such as the heart, brain and skin. If a person loses a lot of blood, their circulatory system may fail and be unable to deliver enough oxygen to their body. This can lead to shock and, ultimately, death if not addressed. Common causes of life-threatening bleeding include road traffic collisions, machinery accidents, knife wounds and gunshot injuries. External bleeding forms the basis of this topic. See also Chest and abdomen injuries and Amputation for information on treating those types of injuries.

Internal bleeding, such as unseen bleeding into the chest or abdominal cavity, is also life-threatening. Management of internal bleeding is outlined in Shock, with emphasis on recognition and positioning.

Guidelines

- First aid providers should use direct manual compression for life-threatening external bleeding.**
- First aid providers should not use pressure points (indirect manual pressure) or ice to stop bleeding.**
- If direct manual compression is ineffective or unable to be performed, first aid providers may use a tourniquet for severe, life-threatening external extremity bleeding.*
- If a tourniquet is used, a manufactured tourniquet is preferred. An improvised tourniquet may be less effective than a manufactured tourniquet, but may be applied if that is all that is available for severe, life-threatening external extremity bleeding.*
- First aid providers may use a manufactured windlass tourniquet for the management of life-threatening extremity bleeding in children.*
- If direct manual compression is ineffective, and a tourniquet is not practical, available or appropriate, a haemostatic dressing may be used for severe, life-threatening external bleeding. The haemostatic dressing should be applied directly to the source of bleeding with direct pressure.*

Good practice points

- Emergency medical services (EMS) should be accessed for all severe bleeding.
- First aid providers should protect themselves from the person's blood by putting on gloves or covering their hands (e.g. with plastic bags, bandages or clothing).
- First aid providers (or the injured person, if able) should apply direct manual compression rather than applying a bandage that wraps around the body part to apply even pressure

(also called a circumferential pressure dressing) to a severe bleed. If bandages are available, they can be used to apply pressure. Once severe bleeding has been controlled, a bandage may be applied to the wound. However, if a bandage is unavailable, clean materials such as clothes or towels may be used as improvised bandages.

- If the bleeding cannot be stopped, first aid providers should consider:
    - applying consistent, direct pressure with more force
    - applying a tourniquet to an extremity wound and ensuring it is sufficiently tightened
    - applying a haemostatic dressing on the wound while continuing to apply direct pressure.
- First aid providers should apply pressure around an embedded object (e.g. a knife) to stabilize the object. Avoid removing the object.
- Tourniquets should only be used for life-threatening extremity (i.e. limb) bleeding. They may help save a life, but may have severe consequences (e.g. amputation of the limb), especially if applied for too long. Once a tourniquet has been applied, keep it in place until EMS arrive.

Chain of survival behaviours

Prevent and prepare

- Learn how to control bleeding using the resources likely to be available, such as bandages, clothing or manufactured tourniquets.

Early recognition

- Blood is flowing or spurting from a wound.
- Action to stem the flow of blood should be taken as soon as possible. Even a cupful of blood, although not immediately life-threatening, can lead to fast deterioration if not stopped early on.

First aid steps

1. Ask the person to apply direct pressure to their injury with their hands.
2. Help the person to lie down.
3. Access EMS.
4. Apply direct pressure to the bleed. If blood soaks through the dressing, apply a second dressing over the first one and apply greater pressure.
5. If direct pressure is ineffective and the person is bleeding from an arm or leg, consider applying a tourniquet or haemostatic dressing, if available. Continue to put direct pressure on the bleed. In the case that a tourniquet is ineffective, you can add a second tourniquet above the first.
6. Shock is likely to develop from significant bleeding. Help the person into a comfortable position and keep them warm by wrapping them in clothing or blankets if necessary.

If the injured person can apply pressure to their own wound, this can reduce the risk of cross-infection and keep both the first aid provider and the injured person safe.

If the injured person becomes unresponsive, open their airway and check for breathing after stopping the bleeding.

SPECIAL CASES

- In situations of disaster or conflict, including war, terror attack or violent attack (such as shooting or stabbing), the safety and security of the first aid provider and the injured person are paramount and take precedence over providing immediate care.
- The application of tourniquets in these situations may be used as the first short-term "stop the bleed" measure, to either deal with the overwhelming number of injured people or to get people with severe life-threatening bleeding out of an immediate danger zone. In both cases, the release of the tourniquet should only be considered under the guidance of a medical professional.

Access help

- Severe bleeding is a life-threatening condition requiring medical care. Clearly explain the cause of the injury and the condition of the person to EMS so they can prioritize your case accurately.

Education considerations

Context considerations

- Consider the local health system, especially the availability of well-developed emergency care and manufactured tourniquets, to decide whether to include tourniquet education.
- Consider local laws and regulations, as well as the availability of haemostatic dressings, before including them in learning design.
- Some contexts may have a high incidence of bloodborne pathogens (e.g. HIV), or there may be a low incidence but high levels of fear about them. In these contexts, allow learners to consider real versus perceived risks associated with the transmission, and reinforce good universal precautions.
- Use scenarios built around the local industry (e.g. agriculture) or local factors such as road traffic behaviour, violent conflict or crime, to make education on this topic relevant to learners.

Learner considerations

- Consider where learners live and work and discuss the most likely causes of injuries that cause bleeding in the local setting to give context and relevance to the topic.
- This topic can be quite graphic (both in training and in reality). The use of images and video can be helpful in preparing learners for what they might see in reality. However, this may be unsuitable for children and some other learner groups. Scenarios and storytelling with or without actors might produce engagement without fear and upset.
- Conversely, the use of fake blood to create scenarios and pretend injuries can be fascinating and informative for learners and encourage engagement.

- Check whether learners have a first aid kit, dressings or manufactured tourniquets in their homes, or whether they might be able to access them (Andrade et al., 2020).
- Consider only including haemostatic dressings in training for more advanced first aid providers and in instances where learners may enter remote areas.

Facilitation tips

- Discuss with learners how to recognize a severe bleed: how much blood is coming out? What does it look like? Discuss it in terms of volume (e.g. cup-full, ounces); how it looks (forming a puddle or pool, soaking through the bandage) and the emotional reaction they might have (Pellegrino et al., 2020).
- Emphasize that timely intervention to stop bleeding is vital and may be a life-saving action. Applying pressure to a bleed is often a simple action, easy to do and can be very effective.
- Support learners to practise feeling how much and what sort of pressure is needed to stop a bleed and how this will feel for the injured person. Consider different postures that learners could take to apply sufficient pressure depending on their physical strength (Charlton et al., 2019).
- Discuss with learners what they should do depending on where the bleed is coming from on the body: when to use a tourniquet (on a limb) or when to apply pressure or use a dressing (Pellegrino et al., 2020).
- Discuss the practicalities of there being a lot of blood and what to do when a bandage is soaked through. Explain that the pressure will be reduced if more and more bandages are applied (Charlton et al., 2018).
- Encourage learners to think creatively about the materials they have nearby in their relevant contexts that could be used to stop a bleed, such as a clean towel or T-shirt. Emphasize that even if there is nothing available, they can apply pressure with their own hand if they do not have any open cuts, as the risk of infection is very low.
- Emphasize the importance of direct pressure before finding a bandage to apply. Once the flow of blood has been stopped using pressure, help learners to practise applying a bandage so that it is secure and maintains sufficient pressure. Try bandaging different body parts.
- The topic of bleeding has many potential barriers that could reduce learners' intention to help, such as infection, fear of blood or concerns of violence. While these should be explored, the aim should be to develop pro-helping strategies.
- Explore ways learners can protect themselves and the injured person from blood-borne viruses while still providing life-saving care if this is a concern (e.g. they could wear gloves or ask the injured person who is bleeding to apply pressure to their own wound). Avoid creating a barrier to helping through fear of infection. Explore what alternatives may be available if a person does not have gloves (e.g. a plastic bag).
- Facilitate a discussion on the common fear of blood, highlighting it as a potential barrier to providing help. Allow learners to practise dealing with bleeding if it may help build their confidence or develop other strategies to overcome their barriers (e.g. directing the injured person to apply pressure to their own wound).
- Emphasize that objects embedded in a wound should be left where they are if there is the possibility of severe bleeding, as the object may be acting as a "plug". Removing it may make the bleeding worse.

- If teaching learners about tourniquets, train them on how and when to use them for safe and effective use. Tourniquets are powerful tools for bleeding control but can also cause harm if used incorrectly. Emphasize that tourniquets should only be used when direct pressure on the bleed is ineffective and the injury is on a limb.
- Consider what style of tourniquet is available locally and train in that specific style. Training in applying one style of a tourniquet will not necessarily facilitate skill transfer to other tourniquet styles (McCarty et al., 2019).
- Discuss why improvised tourniquets might be less effective. This could be because they cannot be adequately tightened to provide the required amount of pressure and are more likely to break (McCarty et al., 2019).
- Emphasize that the application of a tourniquet is very painful if done correctly, and the injured person may respond violently and try to remove the tourniquet. By being prepared for this the first aid provider can ensure their own safety, but also prepare the injured person, which will make it easier for them to cope with the pain.
- If haemostatic dressings are included in education, training in the proper assessment of severe bleeding and the dressing application techniques are required. Emphasize they should only be used in instances of life-threatening bleeding (Goolsby et al., 2019; Zietlow et al., 2015).

Facilitation tools

- Provide a glossary of words or phrases that may be used interchangeably (e.g. bleeding and haemorrhage).
- Discussing what “severe bleeding” means and looks like could be a useful starter for this topic. This could take place as a discussion exercise using a flipchart with the heading, “What other words can you think of that describe ‘severe bleeding’?” Answers may include gushing, flowing, spouting, running like an open tap, soaking through the bandage or pooling on the floor.
    - This could be followed by exercises using images and the questions:
        - What do you think has happened here?
        - How badly is this person bleeding?
        - What happens when someone loses a lot of blood?
        - How do they look?
        - How do you think they might be feeling or might behave?
        - What do you think will happen next?
    - Facilitators can use this to develop a “common language” and understanding for the rest of the topic.
- Encourage learners to share their experiences with severe bleeding, and ask groups to explore the topic through storytelling and role play scenarios. Role play can be particularly beneficial as a dynamic and interactive learning format.
- It may be useful to show how different clothing or flooring can affect the perception of how much blood has been lost. Soil or thick clothing, for example, can demonstrate how severe blood loss can be hidden.
- Use a range of objects to demonstrate bleeding and how to treat it. For example, get a plastic bottle (full of water coloured with food dye). This could be wrapped up in clothing

to look less like a bottle. Then an object (such as a nail or knife) could be pushed into it to simulate a penetrating object. With someone else squashing the bottle (to simulate the blood pressure and cause the "wound" to bleed), learners could practise how to apply pressure, how to stabilize an embedded object or how to dress a wound.

- Alternatively, use fruit (such as an apple) to create "wounds" which can be dressed. Or use teddy bears to practise applying pressure or bandaging.
- Use simulation to help learners experience the real challenges they may face when dealing with someone who has an object embedded in their body. Highlight the importance of reducing harm when the possibility of not moving the object is competing with the possibility of moving the person to a health facility.
- Creating fake wounds with fake blood and other makeup products can help create realistic scenarios to support learning.
- If you have multiple tourniquets, hand them out to the learners. Then demonstrate the correct application of the tourniquet on a volunteer (without tightening it completely) and ask learners to repeat it. Gradually increase the stress of the scenarios: put time limits on, increase background noise, shout (only once a level of trust has been created) and eventually instruct learners to apply tourniquets in uncomfortable and challenging settings, such as upside-down or in the dark. Also, there is value in teaching them how to self-administer, especially when educating individuals who carry weapons.
- If appropriate to the learner group, use visual resources to enable realistic exposure to the sights and sounds associated with the subject and an opportunity to see the graphic nature of some injuries.

Learning connections

- Learners should be taught to recognize the signs of Shock.
- Conditions which may result in severe external bleeding include Amputation, chest and abdomen injuries, cuts and grazes, mammal bites, and fractures.
- Note particularly that an open chest wound may be bleeding but requires careful management to ensure the wound can receive air. See Chest and abdomen injuries.
- Maintaining the safety of the first aid provider is paramount.
- Localized application of ice or something cold may be beneficial for a minor or a closed bleeding injury, such as bruising or a haematoma.

Scientific foundation

Systematic reviews

The International Liaison Committee on Resuscitation (ILCOR) conducted several systematic reviews on multiple interventions for the control of life-threatening external bleeding (Singletary et al., 2020a; Singletary et al., 2020b). In addition, the Centre of Evidence-Based Practice (CEBaP) conducted an evidence summary about the use of pelvic binders in cases of pelvic injuries.

Pressure dressings, bandages, devices or proximal manual pressure

Six studies compared the use of pressure dressings, bandages or devices to direct manual pressure. Three in-hospital randomized controlled trials and one in-hospital cohort study demonstrated a significantly longer time to haemostasis with the use of mechanical pressure devices (pneumatic device, Femostrop, C-clamp) compared with the use of direct manual

pressure. In contrast, one in-hospital cohort study showed a shorter time to haemostasis with the use of a mechanical clamp. For the outcome of cessation of bleeding, one in-hospital randomized controlled trial showed the benefit of a combined clamp and manual compression compared to pneumatic compression. Also, one in-hospital cohort study showed higher rates of bleeding cessation when using a commercial, elasticized compression bandage compared with manual pressure. Three in-hospital randomized controlled trials and three in-hospital observational studies did not report a significant difference in complications with the use of either pressure devices or manual pressure. No evidence was identified for the critical outcome of mortality resulting from bleeding or the important outcome of mortality from any cause. All evidence is of very low certainty.

Pressure points

No human studies were identified comparing the use of pressure points with direct manual pressure.

Tourniquets

In 13 studies, the use of a tourniquet was compared to direct manual pressure. In four prehospital civilian cohort studies, there was no reduction in mortality from bleeding with the use of tourniquets compared to direct manual pressure alone. A higher cessation of bleeding was found in a large prehospital military cohort study when comparing tourniquet use to direct manual pressure alone, but this could not be shown in an additional very small cohort study. In a large civilian prehospital cohort study, a significant reduction of all-cause mortality was shown, but this was not the case in five other civilian studies with unadjusted analyses and six prehospital military cohort studies. A difference in complications (e.g. amputation) or adverse effects could not be shown in five prehospital civilian cohort studies and one prehospital military cohort study. For the outcome of time to haemostasis, no studies were identified. All evidence is of very low certainty.

A prehospital military cohort study was identified comparing tourniquets with haemostatic dressings. No difference in mortality caused by bleeding was found, but there was a significant all-cause mortality risk reduction. However, in this study, the types and locations of wounds were not reported, and it is unknown if the injuries were comparable. For the outcomes of complications or adverse effects and time to haemostasis, no studies were identified. The evidence is of very low certainty.

No human studies were identified comparing manufactured with improvised tourniquets. Four observational simulation studies were found that provided information about the ability of first aid providers to stop bleeding with both types of tourniquets. In one study, greater success of pulse cessation in lower and upper extremities was shown with manufactured compared with improvised tourniquets. In a second study, a decrease in bleeding cessation was shown to be greater with manufactured tourniquets over improvised cravat tourniquets or bandanna tourniquets. All evidence is of very low certainty.

No human studies were identified comparing windlass-style manufactured tourniquets (i.e. one with a rod to tighten the tourniquet) with other types of manufactured tourniquets for the management of severe, life-threatening external extremity bleeding. Ten simulation studies

provided information about the feasibility of the use of windlass-style manufactured tourniquets compared with other designs of manufactured tourniquets.

In 2021, ILCOR performed a systematic review of the use of paediatric tourniquet types. This review identified two cohort studies using a manufactured windlass rod tourniquet (Charlton et al., 2021; Wyckoff et al., 2021; Wyckoff et al., 2022a). Pooled data from these studies showed cessation of pulses in 71 of 71 upper extremities and in 69 of 73 lower extremities, in the 73 children between two and 16 years old. Based on this evidence, ILCOR suggests the use of a manufactured windlass tourniquet for the management of life-threatening extremity bleeding in children. However, it is a weak recommendation with very low–certainty evidence. An evidence update for this review was conducted in 2022, but no new studies were identified (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

Haemostatic dressings

There were 19 studies identified comparing the combined use of haemostatic dressings and direct pressure to direct pressure alone. For the outcomes of cessation of bleeding (studied in three in-hospital randomized controlled trials and one in-hospital cohort study) and mortality (one prehospital military cohort study and two in-hospital civilian randomized controlled trials), no benefit of the additional use of haemostatic dressings could be shown. In 15 in-hospital randomized controlled trials, faster haemostasis was shown with the additional use of haemostatic dressings, and in one of these, a decrease in the number of blood-soaked gauzes was found. In four randomized controlled trials and two cohort studies, a difference in complications and adverse events when using haemostatic dressings and direct pressure, compared to direct pressure alone, could not be shown. No evidence for the outcome of mortality caused by bleeding was identified. The evidence is of low to very low certainty.

Three in-hospital civilian randomized controlled trials compared one type of haemostatic dressing to other types, but a difference in time to haemostasis (moderate-certainty evidence), all-cause mortality (very low-certainty evidence) and adverse effects (very low-certainty evidence) could not be demonstrated. No studies were found on the outcomes of mortality due to bleeding, cessation of bleeding or any complications/ adverse events.

No human studies comparing junctional tourniquets with direct pressure, or comparing wound clamps with direct pressure for the management of severe, life-threatening external bleeding were identified.

ILCOR conducted an evidence update on this topic in 2023 (Berg et al., 2023a; Berg et al., 2023b), but the majority of articles researched postsurgery bleeding or malignant ulcers, and no relevant new studies were identified.

Pelvic binders

Although the evidence is very uncertain, the results of four observational studies and one randomized controlled trial suggest that applying a prehospital pelvic circular compression device (e.g. a pelvic binder) does not significantly decrease mortality, transfusion requirements or need for surgical intervention in patients with (suspected or confirmed) pelvic injury.

Education review

Several additional papers were found through the educational literature search. Included below are papers which had specific educational considerations for learners on this topic.

Andrade et al. (2020) show the additional confidence learners gain by having access to bleeding control equipment. They undertook a study with medical professionals and community members to see if receiving a trauma first aid kit in addition to bleeding control training improves self-reported confidence. After completing bleeding control training, participants assembled their own trauma first aid kits in a provided tactical pouch, which included properly sized personal protective equipment, a combat application tourniquet, haemostatic gauze and bandages, a flashlight, a marker and trauma shears. After receiving bleeding control training, those who did not receive a trauma first aid kit were significantly less confident in stopping life-threatening bleeding among both medical professionals and community members.

Pellegrino et al. (2020) identified a gap in a standardized assessment tool to measure the educational effectiveness of the "Stop the bleed" campaign. More than a million people in the United States have received training on how to deal with life-threatening bleeding via this campaign. The authors developed and validated a tool with the input of experts, educators and community learners. The tool covers recognition of life-threatening bleeding and where, when and how to apply pressure, a tourniquet or a dressing. Haemorrhage control experts identified six oz (≈177 ml) of blood loss to represent life-threatening bleeding for first aid providers. The tool used everyday language to represent medical terms and constructs. For example, people looking at a six oz pool of "blood" described its volume, what it looks like and how it made them feel. The authors suggest the tool can be used to compare outcomes from different teaching styles and methods in order to allow for the development of best practices for future bleeding control education. In addition, this approach could help organizations demonstrate value to learners, funders and policymakers, and advance health sciences education. The Stop the bleed education assessment tool offers a measure for which educational efficiency and effectiveness can be judged within a larger effort to prepare people for personal emergencies or large-scale disasters.

Goolsby et al. (2019) identified which haemostatic dressings first aid providers might best be trained in. They tested whether first aid providers could apply haemostatic dressings, and which they could use most successfully. 360 people participated in a randomized prospective controlled trial to compare the application of plain gauze (control), z-folded gauze, s-rolled gauze, and injectable sponge (experimental). Participants learned using a video and practise and were assessed on the pressure applied for a set amount of time and the amount of time taken to unpack and apply the dressing. Participants also completed pre- and post-surveys on willingness to use the dressings. Overall, 202 participants (56%) applied dressings correctly. The most successful in terms of the correct application was the injectable sponges (92%), followed by the s-rolled gauze (48%), the z-folded gauze (43%) and the plain gauze (40%). Participants in all cohorts saw significant improvements in willingness to use haemostatic dressings.

To help educators identify the best techniques to teach direct pressure, Charlton et al. (2019) ran a study on the posture a first aid provider should adopt to apply adequate pressure to a severe bleed for a sustained period of time. They tested two-handed pressure with bent arms against two-handed pressure with straight arms. A sample of 30 participants of similar demographics

was randomized to one of the postures and asked to apply force to a standardized haemorrhage control trainer with electronic feedback (Z-Medica), set to record a minimum pressure of 3-psi (155 mmHg) for a three-minute time period. When using bent arms, participants provided pressure at or above 3-psi 63.7% of the time. Participants using straight arms were above 3-psi 100% of the time. The difference between the two experimental arms remained statistically significant when examined by age, gender or medical experience. The authors concluded that a straight-armed posture was the most efficient way to provide high-quality direct pressure to stop life-threatening bleeding.

Advice for first aid providers when a serious bleed seeps through the dressing has been to add an additional layer on top rather than replacing the original dressing. This was questioned by Charlton et al. (2018) who sought to establish whether the pressure needed to stop a serious bleed could be maintained when additional layers of dressing are added. They used a tri-phase randomized crossover trial of medical personnel and a standardized bleeding simulator. Participants were randomized to cohorts of 10, 20 and 30 layers of 4x4 inch cotton gauze, and subsequently to three different methods of pressure application: the finger pads of three digits of the right hand, three fingers of the dominant hand with the opposing hand applying counter pressure, or three digits of each of two hands on top of the other. Participants were asked to hold pressure continuously during each application for 10 seconds. The researchers found that participants generated the most force when a single stack of gauze and two hands were used to apply pressure over the wound, and suggested that first aid educators may apply results to lessons in describing the thickness of the material and the need to apply sufficient pressure to stop bleeding.

Zeitlow et al. (2015) sought to establish whether bleeding control techniques applied in a military context could be translated into a civilian setting effectively. A retrospective review of people who received a tourniquet or haemostatic dressing prehospital was selected where 77 tourniquets were used for 73 people and 62 haemostatic dressings were applied to 52 people. Seven people required both interventions. Mean tourniquet time was 27 minutes, with 98.7% success. Haemostatic bandage application had a 95% success rate. Training for both interventions was computer-based and hands-on, with the maintained ability to perform the skills greater than 95% after two years. The authors concluded that civilian prehospital use of tourniquets and haemostatic gauze is feasible and effective at stopping the bleed. Online and practical training programmes result in the ability to use skills, which can be maintained despite infrequent use. Kragh Jr et al. (2008) considered the efficacy and challenges of teaching first aid providers to use tourniquets. They studied morbidity and tourniquet use specifically in a conflict setting and drew attention to the fact that tourniquets can complicate care if used inappropriately, and that the education of the first aid provider in their use is critical.

Educators in lower-resource settings or areas where tourniquets are not readily available may benefit from learning about the effectiveness of improvised tourniquets, as studied by McCarty et al. (2019). They showed that improvised tourniquets tend to have very poor effectiveness and high failure rates. In a randomized clinical trial that saw first aid providers trained to apply different tourniquet types, Combat Application Tourniquets (CATs) were compared to other commercial and improvised models. In the cases of improvised tourniquets, the learners were allowed to choose from a selection of materials, including leather belts or shoelaces, and plastic

(PVC) or wooden rods to act as a windlass. Improvised tourniquets were found to fail in a number of cases due to breakage of the windlass (70%) when using a plastic windlass, or the leather belt strap snapping (almost 45.8% of the cases) where a wooden windlass and belt were used together. For the "non-windlass" improvised devices, the pressure applied was deemed insufficient in all simulation assessments and demonstrated increased estimated blood loss when compared to the purpose-made CAT device provided for training. Only one of 22 (4.6%) applications of a non-windlass improvised tourniquet was successfully applied. The findings supported an earlier observation during the Boston Marathon incident, where 27 improvised tourniquets were applied in the field, and all were deemed ineffective on post-event review (King et al., 2015, cited by McCarty et al., 2019).

There is a gap in the evidence available on how to prepare first aid providers to deploy tourniquets in a multiple casualty scenario.

Chest and abdomen injuries

Key action

Help the person to lie down in a comfortable position, contact emergency services and monitor the person closely.

Introduction

A chest injury includes any injury to the ribs, heart and lungs, while an abdominal wound includes any injury to the abdomen (may be an injury of the organs, not necessarily). Some chest wounds are “open”, which means there is a hole in the chest, usually caused by injuries such as a gunshot or stabbing. It is also possible to have sucking or blowing chest wounds, which can cause severe breathing difficulties. Learners should recognize open chest and abdominal wounds as potentially life-threatening and be able to provide care.

Guidelines

- First aid providers should not use an occlusive dressing on a person with an open chest wound.*

Good practice points

- Safety and security are paramount, and in situations of danger, first aid providers need to be alert to the risks they face from weapons and aggression.
- First aid providers should consider the potential for blunt force trauma in the event of a gunshot, blast or knife injury to someone wearing a ballistic vest.
- First aid providers should help a person with a chest or abdominal injury to lie down in a comfortable position. For someone with a chest injury, this may be lying semi-propped up on their affected side. For someone with an abdominal injury, this may be lying down with bent legs.
- If there is significant external bleeding from an abdominal wound, direct pressure with or without a haemostatic dressing should be applied.
- An open chest wound that is not actively bleeding may be left open, without the application of a dressing, because a sealed wound may allow air to build up in the chest, which may lead to the lung partially or fully collapsing (pneumothorax).
- If applying pressure to an open chest wound, ensure the pressure does not completely seal the wound. If the wound is bubbling or making noise, do not completely seal the wound.
- If a dressing is necessary on an open chest wound (e.g. to transport the person a long distance to receive medical care), a non-occlusive dressing may be used.
- A sterile (or functionally clean) and wet dressing may be placed on open abdominal wounds where internal organs are visible.
- First aid providers should not push internal organs back into the body.
- Impaled objects in the body should be stabilized, and if the object is pulsating, it should be allowed to do so while loosely stabilized.

- First aid providers should access emergency medical care for all penetrating chest or abdominal wounds.
- First aid providers should treat the person for Shock. This may include helping the person to lie down in a comfortable position and keeping them warm.

Chain of survival behaviours

Prevent and prepare

- In workplaces where there is a high risk of falls, crush injuries or explosion risks, such as construction and mining, include training on this topic and provide appropriate first aid equipment.
- Wear a ballistic vest when entering a conflict zone if possible.

Early recognition

The person has experienced physical trauma, such as from a road traffic collision, a weapon or a fall. You may not be able to see the wound as it might be internal or under clothing. Talk to the person and ask them about their condition to locate the injury as quickly as possible. There may be multiple wounds from a single projectile.

A person who has experienced physical trauma may have an internal injury that is bleeding inside their chest or abdomen. This may only become apparent if the person starts to show signs of shock.

A person with an open chest wound may have difficult or painful breathing, and they may cough up blood.

First aid steps

Once in a safe location, examine the person as carefully and thoroughly as possible.

Abdominal injury

1. Help the person get into a comfortable position. Usually, this is a lying position with the knees pulled up, as this reduces tension on the abdomen.
2. Control any external bleeding by applying pressure.
3. Access emergency medical services (EMS).
4. Place a clean dressing over a bleeding wound once the bleeding is controlled by pressure. If internal organs are bulging out, do not try to push them back into the abdomen. Cover them with a clean, wet dressing.
5. Reassure the person and monitor their breathing, circulation and level of response, particularly for any signs of shock.

Chest injury

1. Help the person get into a comfortable position. Typically, this involves sitting with one leg slightly elevated and leaning on the injured side to maximize the function of the other lung.
2. Control any external bleeding by applying pressure using your hands, ensuring the pressure does not completely seal the wound.
3. Access EMS.

4. Reassure the person and monitor their breathing, circulation and level of response, particularly for any signs of Shock or breathing difficulties.

CAUTION

- Do not seal an open chest wound. If the wound is sealed, blood may clot and seal the wound, allowing air to build up in the chest and potentially leading to tension pneumothorax.
- If a dressing is necessary on an open chest wound (e.g. to transport the person a long distance to medical care), a non-occlusive dressing can be used. Monitor the dressing to ensure it remains open, allowing air to pass through it.
- Do not remove any impaled objects from an abdominal or chest wound, as this may cause serious bleeding and make it more difficult for a medical professional to determine the severity of the wound.

Access help

- Access EMS immediately. Chest and abdominal injuries can be life-threatening and need medical attention.
- Chest and abdominal wounds are common in conflict and crises. Before treating people, it is essential to call for help, including the police or security services and to act only if it is safe to do so.

Education considerations

Context considerations

- Road traffic collisions are common across the globe and are a major cause of traumatic injuries.
- In fragile contexts where there is violence and injuries of this kind are more common, learners will have to pay close attention to issues regarding personal safety.
- This topic can be sensitive, depending on cultural, religious or gender norms within the context. Adapt the education and simulation appropriately.

Learner considerations

- Consider the context of learners' helping behaviours or willingness to help. For example, learners may display a willingness to help friends or family in a community affected by conflict, but may be reluctant to help bearers of weapons.
- Consider the psychological effect that injuries of this type (in conflict or peacetime situations) may have on first aid providers and explore options available for supporting them after the incident.

Facilitation tips

- The published literature indicates the importance of the correct management of an open chest wound. Emphasize the importance of using a non-occlusive dressing to prevent the development of a potentially life-threatening complication.
- Emphasize that any non-occlusive dressing placed on an open chest wound should be closely monitored (as well as the person's breathing). This is because all dressings can become sealed (occlusive), due to blood clotting.

Facilitation tools

- Prioritize simulation to give learners time to practise and develop their skills in managing chest and abdominal wounds, to use their skills in a realistic scenario and to debrief.
- Use virtual reality, video, serious computer games or simulation mannequins if available to explore this topic, particularly the application of dressings around impaled or embedded objects.
- Low-tech, high-quality simulation can also be very effective. For example, rice or flour sacks can be stitched together and filled with straw or sand to create a mannequin of adult size. Or a pillow could be tied to a post to act as a mannequin. These can be used to simulate different injuries, including impaled or embedded objects.

Learning connections

- A wound may have external bleeding.
- A person with an internal or external injury may develop shock.
- Build realistic scenarios that emphasize the principles laid out in the general approach, such as staying safe.
- Chest and abdominal wounds may be more common in areas of conflict or disaster, and also may require first aid providers to deal with multiple casualties.

Scientific foundation

Systematic reviews

The International Liaison Committee on Resuscitation (ILCOR) First Aid Task Force developed a systematic review on the appropriate first aid care for open chest wounds (Singletary et al., 2015; Zideman et al., 2015). No human studies were found. ILCOR published an evidence update on this topic in 2022, but again, no human studies were identified (Wyckoff et al., 2022b; Wyckoff et al., 2022c). The treatment recommendation, suggesting against the application of an occlusive dressing or device by first aid providers to individuals with an open chest wound, remains in place.

The Centre for Evidence-Based Practice (CEBaP) updated two existing evidence summaries: one on the use of non-occlusive dressings and another on the use of the recovery position in people with an open chest wound, but no studies could be identified.

Additionally, with regards to abdominal wounds, CEBaP did not find any evidence to support the repositioning of externally herniated internal organs, applying pressure on the injury, or the optimal position in which to place the injured person.

Amputation

Key action

Stop life-threatening bleeding and preserve the amputated body part(s) if possible.

Introduction

There are two types of amputations: complete and partial. Complete amputation is the total removal of a body part, while partial amputation is when part of the body part is still attached to the body. Amputation does not always lead to the loss of the amputated body part. In some cases, the limb can be reattached. Immediate first aid care may improve the chances of recovery.

This topic should be taught in conjunction with the severe bleeding topic.

Good practice points

- In the case of a complete amputation:
    - Completely amputated and avulsed body parts such as fingers, hands, arms and legs should be retrieved and transported as soon as possible, preferably with the injured person, to the same health care facility.
    - To prevent tissue damage, the amputated body part should be wrapped in a sterile compress or bandage and placed in a clean, watertight plastic bag. The bag should be sealed to prevent water from coming into contact with the body part.
    - The first bag containing the part may be placed in a second plastic bag or container of cold water or ice, as this will preserve the body part. There should be no direct contact between the body part and the ice.
    - The first aid provider should send the amputated body part to the medical facility with the person.
- In the case of a partial amputation, immobilize the limb in normal anatomical alignment if possible (it might not be possible if the limb is fractured or dislocated). Do not straighten an angulated fracture or dislocation.
- If the distance to the hospital is less than a few hours, do not allow the injured person with a partial or complete amputation to eat or drink, because anaesthetic may be required. If the distance to the hospital is very far and the person is responsive, allow them to sip water.

Chain of survival behaviours

Prevent and prepare

- Amputations can occur when using fireworks, explosive devices and in conflict situations. It is important for first aiders to be aware of the safety considerations for these situations.
- Some countries that have previously experienced conflicts or war still have leftover mines or unexploded devices. Precautions in these areas are extremely important.

- Maintain a safe workplace environment by following safe work practices, such as installing auto shut-off valves on equipment that could cause amputations, including certain kitchen, mining or construction equipment.

Early recognition

A limb or part of a limb has been severed from the rest of the body.

First aid steps

- Access emergency medical services (EMS).
- If the wound is bleeding heavily, apply pressure to the wound to stop the bleeding. Follow the steps for severe bleeding and also treat the person for shock. Once the bleeding has been controlled, complete the rest of the steps listed here.
- If the amputation is partial:
    - Advise the person to keep the limb as still as possible, preferably in a position of normal alignment, to protect it from further amputation.
    - Use a sterile bandage, dressing or clean cloth to cover the wound and keep the limb in place.
- If amputation is complete:
    - Use a sterile bandage, dressing or clean cloth to cover the wound.
    - Keep the amputated body part dry and cool. To do this, place the amputated body part in a clean, watertight plastic bag, and firmly seal it. Place this inside a larger container of ice and water and send it with the person to a medical facility.
- Apply psychological first aid practices for both the first aiders and the injured person and their family.
- Immobilize the limbs as much as possible during transport.
- Note that this is a significant open wound; everyone should be considered for disease transmission.

CAUTION

- Do not place the body part directly in water or on ice, as this may damage the tissue and make it more difficult or impossible to reattach it.

Access help

Tell EMS about the injury so they can prepare or bring appropriate equipment.

Education considerations

Refer to the severe bleeding topic for additional education considerations.

Context considerations

- Amputations can occur in particular industrial settings where there is heavy, sharp or fast-moving machinery, and in conflict settings, due to the explosions of land mines. Facilitators can use case-based examples or scenarios to support learning where these instances might occur. Exploring the most likely incidents that could result in amputation in the local setting will give context and relevance to the subject. This knowledge can be

learned through research before the session or could be posed as a question to the group.
- Amputation care kits, which include materials and instructions for properly storing and transporting amputated body parts, are available and could be useful in certain situations.

Learner considerations

- Use of video or photographs can create a realistic exposure to the subject and an opportunity to see the graphic nature of some injuries. They should be used with caution based on the sensitivity and expectations of the learners.

Facilitation tips

- Due to the traumatic nature of amputation, learners may be encouraged to share stories about experiences, scene safety and resources, if they feel comfortable doing so. Role play where groups of learners might learn how to respond quickly and use team-based skills is useful. Peer support can be an effective approach.
- Amputation is a particularly graphic and psychologically affecting injury where the injured person has lost a “piece of themselves”. This can be very disturbing for them, but also for first aid providers. As such, it is important to address the barriers that may affect people’s willingness or confidence to provide first aid in the presence of amputation. The permission to explore the fact that they might be afraid or squeamish allows learners to develop strategies to overcome these barriers in real life.
- Bystanders and family members are invariably more distressed when amputations have occurred, often more so than the injured person themselves (who can display a “protective dissonance”). Empathy and support for them should also be discussed.
- Emphasize that timely intervention to stop bleeding is vital and may be a life-saving action; simple actions can be very effective. Learners should have confidence that their actions will make a real and positive difference.
- Tourniquets may be used if direct pressure does not control the bleeding. Note that in an amputation, the tourniquet may not entirely stop the blood flow (due to blood loss through the “middle” of the bone). First aid providers should know that if there is still minor bleeding (not gushing), the tourniquet is working.
- Brainstorm alternatives for cooling an amputated body part during transport (e.g. sealed bag of seawater, wet sand, plants).

Facilitation tools

- Images of amputation injuries might be useful here. Especially if it is possible to demonstrate a “full patient story”: how the injury occurred, the story of treatment and the final healed result in the same person. This will go a long way to providing confidence to act.
- For child learners, consider age-appropriate imagery. Presenting the possibility of a return to a near “normal life” at the story's end will achieve the same aims without fear.

Learning connections

- This topic should be taught in conjunction with severe bleeding, focusing on the use of direct pressure, and (where permitted locally) tourniquets and/or haemostatic agents.
- Severe bleeding from an amputation injury is likely to result in Shock.

- It may be useful to teach this topic with reference to the first aid for a fractured bone.
- Learners may benefit from making connections to practices in psychological first aid or traumatic event.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) developed an evidence summary on keeping amputated body parts on ice in 2019, which was updated in 2024. Only one observational study was included, involving 62 people with 66 digital tip amputations. However, a significant decrease in graft rejection rate when keeping the body part cool during transport, compared to not keeping the body part cool during transport, could not be demonstrated. The evidence is of very low certainty, and the result is imprecise due to a low number of events and large variability in results.

In addition, the International Liaison Committee on Resuscitation (ILCOR) conducted a scoping review, including case series and case reports, that identified 37 studies. The majority of these studies seem to support the prehospital cold storage of amputated body parts. While planning a full systematic review on this topic, ILCOR formulated two Good Practice Statements: amputated body parts should be retrieved and transported as soon as possible, and cooling the amputated body part as soon as possible and throughout transport to a medical facility might improve replantation outcomes (Djärv et al., 2025a; Djärv et al., 2025b).

Education reviews

No academic publications that considered educational methods were found for this topic. However, source material from field manuals was used to inform the content of the chain of survival behaviours and the Education considerations. These consisted of:

- First aid in armed conflicts and other situations of violence (International Committee of the Red Cross, 2013)
- Paediatric Blast Injury Field Manual (Bree et al., 2019)
- Joint Royal Colleges Ambulance Liaison Committee clinical guidelines (Brown et al., 2019)

Cuts and grazes

Key action

Clean the wound and cover it to improve healing and reduce the risk of infection.

Introduction

Cuts and grazes are common injuries seen by first aid providers. They do not usually require emergency medical care. They may include wounds such as a laceration, puncture wound or abrasion. There may be a risk of infection, for example, bacteria or tetanus.

Guidelines

- Superficial cuts and grazes should be cleaned with potable (clean) water, preferably from a tap to provide pressurised water flow and protect against infection.**
- After cleaning, covering the wound with tape, hydrogel, film or hydrocolloids may decrease wound size and redness, and help the wound heal faster.*

Good practice points

- Clean water or sterile saline is the best choice for cleaning wounds. If they are unavailable, first aid providers can use povidone iodine. Some other disinfectants cause more harm or pain than benefit (e.g. isopropyl alcohol or hydrogen peroxide).
- Advise the person to seek medical help if they are not protected against tetanus.
- If the skin around the wound becomes red, purple or darker, and is warm and painful, or if the person develops a fever, advise them to seek medical care, as this is an indication of infection.

Chain of survival behaviours

Prevent and prepare

- Wear appropriate protective clothing for the activity.
- Learn safe techniques to carry out activities that may cause harm.

Early recognition

- After a small incident, the person has a cut, graze, wound, puncture, tear or scrape on their skin.

First aid steps

1. If the wound is bleeding heavily, apply pressure to the wound to stop the bleeding. Follow the steps for severe bleeding. Once the bleeding has stopped, complete the rest of the steps listed here.
2. Clean the abrasion or wound with potable (clean) water, preferably lukewarm and from a tap to provide pressurised water flow. If clean water is unavailable, sterile saline or povidone iodine may be used to clean the wound.

3. Use water, ideally running water, then a clean compress to remove any dirt that is left in the wound.
4. Dry the area around the wound and cover the wound itself with a dressing such as tape, hydrogel, plastic film or hydrocolloids. If you have no access to such dressings, apply a sticking plaster.

Local adaptation

- If you have no access to a tap with potable water, a clean, unused water bottle can be pierced and used to apply a gently pressurised stream of water to the wound.

Access help

Advise the person to seek medical help if they are not sufficiently protected against tetanus. If the wound was dirty, the person should receive a tetanus update every five years. If the wound was clean, it is usually every 10 years.

Recovery

Cuts and grazes usually heal within a few days. Check the outside of the dressing each day:

- If it is still clean, do not change it.
- If it is visibly stained with a bit of blood or some clear fluid, remove the dressing. Clean the wound again (using tap water or a disinfectant) and put on a new dressing.

Monitor the wound for any signs of infection. If the skin around the wound becomes red, purple or darker and is warm and painful, or if the person develops a fever, this indicates an infection. Never cover an infected wound; seek medical help.

Education considerations

Context considerations

- Programme designers should consider particular local risks that may cause cuts and grazes, as well as access to potable (clean) water and dressings.
- The use of topical antibiotic ointment depends on local laws, regulations and processes, including liability protection. Educators may need to vary the treatment options according to the local context.

Learner considerations

- Different populations respond to wounds (particularly minor abrasions) in different ways. While children can react to the shock of the injury by demonstrating high levels of pain, adults might be embarrassed to "cause a fuss". Explore with learners how different people might respond by discussing experiences and different severities of wounds, and how they would approach providing care.

Facilitation tips

- Most people have experienced or seen a wound. Work with these personal experiences to deconstruct prior knowledge and create a new collective understanding that is based on the evidence-based first aid techniques (i.e. clean and cover).
- There are myths and social conventions for wound treatment. Allow learners to share these in order to dispel any incorrect practice. However, facilitators should be careful not

to dismiss local treatments without evidence, as they might be effective. Facilitators will lose credibility if locally effective treatments or traditional practices are ignored without good reason.

- Prepare well for this topic to enable it to be as experiential and hands-on as possible. Create a range of different types of wound simulations that can promote critical thinking about the help to provide. Give learners the experience of cleaning the wounds (making sure that foreign objects do not enter the wound during cleaning) and dressing the wounds (including the use of a range of dressing types).
- Alternatives to items in a first aid kit can help learners develop confidence in improvising with objects around them, such as using a clean cloth as a bandage alternative. Facilitate an exercise where learners think of as many items as they can that they have in their homes or workplaces that they could use as alternatives to items in a first aid kit.

Facilitation tools

- The use of a first aid kit can be an easy and practical way to explain first aid for wounds. As the kit is built, explain the correct use of each of the contents.
- The use of images that show wound healing processes can be useful to illustrate when it is important to seek medical advice for an infection. A comparison can be made between wounds that heal properly and those with infection. Images should be shared sensitively and only after careful consideration of the learner audience.

Learning connections

- Make connections to other topics which may also involve a wound such as severe bleeding, head injury, chest and abdominal injuries and mammal bites.
- Localized application of ice or something cold may be beneficial for a minor, closed bleeding injury such as bruising or a haematoma.
- Emphasize good hand hygiene. The first aid provider should wash their hands before caring for the wound.
- Place this topic within the general approach to practice skills such as assessing the person, communication and empathy.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) developed four evidence summaries in 2019 to inform this topic.

Tap water

CEBaP produced an evidence summary that compared cleaning skin wounds with tap water to no cleaning or cleaning with another solution. The 2024 update of this evidence summary includes a Cochrane systematic review published in 2022, comparing cleaning with tap water, distilled water or cooled boiled water to no cleaning or cleaning with normal saline. In this review, 13 randomized controlled trials were included, conducted with patients with open fractures, surgical wounds, traumatic wounds, anal fissures and chronic wounds. The evidence does not favour one method over another for outcomes such as wound healing, wound size, pain or infection rate. A statistically significant decrease in infection, using normal saline solution

compared to tap water, could not be demonstrated. In one study, a statistically significant increase in healing using tap water compared to saline could not be demonstrated. Evidence is of low to very low certainty, and the results of these studies are imprecise due to the limited event size, large variability of results or lack of data.

Disinfectants

In another evidence summary, updated in 2024, cleaning a skin wound with disinfectant was compared to no cleaning or cleansing with a different type of disinfectant. In total, one non-randomized and eight randomized controlled trials were included in this summary. Povidone iodine is the most researched agent for cleaning and pre-treatment of skin wounds that require stitches or debridement and has a proven disinfectant effect in this type of wound, compared with doing nothing; however, a difference with normal saline could not be demonstrated.

Covering the wound

Another summary, updated in 2024, looked at covering a skin wound (with a sterile compress, wound plaster or bandage) compared to leaving the wound exposed to air. There is limited evidence from five small experimental studies in favour of covering the wound (e.g. with tape, hydrogel, film or hydrocolloids). It was shown that covering the wound resulted in a statistically significant decrease in wound size after three days or after seven to 14 days, a statistically significant decrease in wound redness after 10 to 14 days, and a statistically significant increase in epithelium thickness and coverage after two to seven days, compared to exposing the wound to air. However, the following could not be demonstrated: a statistically significant decrease in wound width or wound area after one to five days, a statistically significant decrease in wound redness after two to seven days, and a statistically significant increase in epithelium thickness and coverage after three to nine days and after 14 days. Moreover, a statistically significant decrease in inflammation could not be demonstrated. Evidence is of low certainty, and results cannot be considered precise due to limited sample size, lack of data and/or large variability of results.

Ointments and creams

An evidence summary was made about the use of ointments or hydrating creams on skin wounds, but no studies on simple skin wounds could be identified. Most evidence is currently available for people with chronic wounds (ulcers and surgical wounds) or in animal models.

Non-systematic review

Two prospective, randomized controlled trials compared the effectiveness of triple antibiotic ointment with both single antibiotic ointment and no ointment in conditions similar to those seen in first aid situations. In one study, the ointment was applied to intradermal (between layers of skin) chemical blisters infected by bacteria (staphylococcus aureus). Contaminated blisters treated with triple antibiotic ointment healed significantly faster and had a lower infection rate than blisters treated with single antibiotic ointment or without ointment at all. Both triple and single antibiotic ointments were more effective than no ointment. In several of these studies, the wounds were initially cleaned with antiseptic solutions, and this may have compromised the

results shown for the antibiotic ointment. However, this complication may support the value of antibiotic solutions (Berger et al., 2000; Caro et al., 1967).

Dental avulsion

Key action

Store the tooth temporarily and advise the person to seek help from a dentist as soon as possible.

Introduction

Dental avulsion is the complete displacement of a tooth due to it being forcefully knocked out. This type of injury is common, particularly in children. However, it is only necessary to replant a tooth if it is a permanent one. A permanent tooth that has been knocked out can often be successfully re-implanted by a dentist if it is done quickly.

Guidelines

- The first aid provider may temporarily store the tooth in:
    - propolis (from 0.04 mg to 2.5 mg per mL of 0.4% ethanol)*
    - oral rehydration salt solutions, such as Ricetral (a commercial form of oral rehydration salt)*
    - solutions containing sodium chloride, glucose, potassium chloride, citrate and extruded rice*
    - clingfilm*
- If none of these options are available, the first aid provider may temporarily store the tooth in cow's milk (with any percentage fat or form).*

Good practice points

- First aid providers may encourage the person to apply gentle pressure to the bleeding gum with gauze to stop the bleeding.
- If the avulsion has created any sharp edges in the person's mouth, advise the person to apply a compress of gauze or clean cotton to protect their mouth from further injuries.
- When picking up the tooth, it should be held at the crown (the area that sits above the gum), not at the root.
- First aid providers must NOT re-implant the tooth.
- The tooth should NOT be cleaned as this could damage vital tissues still attached to the tooth.
- If none of the recommended storage solutions or cow's milk are available, first aid providers may temporarily store the tooth in a container with the person's own saliva. Unless there are no alternative options, do NOT let the person keep the tooth in their mouth, as there is a chance that the person will swallow it (e.g. if the person is not fully responsive, or if they are a child). Instead, use a small jar or another container.
- Refer the person to a dentist or advanced care. Advise them to seek help as soon as possible to encourage successful reimplantation.

- There is no need to consider emergency dental treatment if the tooth is not a permanent one (such as in young children). However, advise the person to seek dental care anyway, particularly if the tooth's root has broken off.

Chain of survival behaviours

Prevent and prepare

- Know what solutions are available to you for storing an avulsed tooth, and have a suitable container available for transportation.
- Wear a mouth guard for contact sports such as boxing, rugby, karate and taekwondo.
- Wear a helmet when riding a motorcycle, bicycle or horse, and for skateboarding.

Early recognition

A tooth has been knocked out.

First aid steps

1. Help the person to stop the bleeding in their mouth by applying a compress of gauze or clean cotton.
2. If the avulsion has created any sharp edges in the person's mouth, advise the person to apply a compress of gauze or clean cotton to protect their mouth from further injuries.
3. Find the tooth and pick it up carefully by the crown. Store it in a salt solution, an oral rehydration solution or clingfilm. If none of these options are available, store the tooth in a container with cow's milk or the person's own saliva.
4. Advise the person to access a dentist or emergency care facility as soon as possible, and to take their tooth with them. If travelling with the person:
    - Maintain a clear airway above all else. If the only option to safely transport the tooth is in the person's mouth, the person must be an adult, fully awake, cooperative and able to do so safely.
    - Check the surrounding tissues (lips, mouth) for further injury
    - Dental avulsion may indicate another injury (e.g. head injury); prioritize any additional injuries appropriately.

When using clingfilm, make sure to add enough of the person's saliva to prevent the tooth from drying out.

Access help

- If a dentist is not available right away, access any available medical care.

Education considerations

Context considerations

- The use of the solutions mentioned in the guidelines depends on availability, local laws and regulations —including liability protection. Facilitators may need to vary their list of recommended solutions accordingly.
- Oral rehydration salts are sometimes provided in first aid kits.

Learner considerations

- Learners who have contact with children or people doing sports might be encouraged to learn how to store an avulsed tooth. Encourage learners to discuss which storage options are available to them in their context, so they are better prepared.

Facilitation tips

- Emphasize that the role of the first aid provider is to help the person (and their avulsed tooth) get to a dentist.
- Remind learners that there might be a lot of blood coming from the person's mouth and that this can be stemmed with a clean cloth or gauze pressed into the gap where the tooth was.

Learning connections

Connect this topic to severe bleeding.

Scientific foundation

The International Liaison Committee on Resuscitation (ILCOR) conducted a systematic review in 2020 to identify the best available evidence for the effectiveness of any technique available to store an avulsed tooth compared with storage in milk or saliva and identified 33 studies (De Brier et al., 2020; Singletary et al., 2020a; Singletary et al., 2020b). In 2024, ILCOR conducted an evidence update for this review and additionally identified one randomized controlled trial and two observational studies (Greif et al., 2024a; Greif et al., 2024b). The ILCOR First Aid Task Force found that the findings of these new studies were consistent with those of the studies included in the 2020 systematic review; therefore, an update of this systematic review was not indicated, and the 2020 treatment recommendations remained valid.

The review included 33 studies and reported 23 comparisons. The limited evidence available favours storing an avulsed tooth in Hank's balanced salt solution, propolis solution, oral rehydration salts, rice water and clingfilm compared with storage in milk. The cell viability rate was significantly lower in teeth stored in saline solutions, tap water, buttermilk, castor oil, GC Tooth Mousse and turmeric extract than in those stored in milk. There is insufficient evidence to recommend for or against the temporary storage of an avulsed tooth in saliva compared with alternative solutions. The certainty of the evidence was considered low to very low due to limitations in study design, indirect study populations and outcome measures, and imprecision.

Friction blisters

Key action

Keep the blister clean and covered to prevent infection.

Introduction

A friction blister is a small pocket of fluid that forms in the outer layers of skin caused by continuous rubbing or pressure over time. Friction blisters commonly appear on feet during or after walking long distances, or on hands after using a tool for a long time during work or recreation.

Guidelines

- If a friction blister does not cause serious discomfort, the first aid provider should consider keeping the blister intact. This may decrease the risk of bacteria and infection, compared to draining it (aspiration) or removing the top layer of the blister (deroofing).*

Good practice points

- Friction blisters can lead to an open wound, bleeding or infection, limiting a person's mobility. In these situations, the person should stop the activity causing the blister, and if possible, cover the blister with a clean dressing. Then seek medical advice.
- If a friction blister filled with fluid causes significant discomfort (e.g. it is painful to walk) or is at risk of self-draining, the first aider should consider draining it (except if the person has a chronic disease such as diabetes). This may reduce the pain associated with the blister. If drained, the blister should be covered with a clean dressing to ensure the roof attaches to the underlying skin and that the blister does not refill with fluid and to avoid infection
- A small (up to two cm) friction blister can be punctured by a first aid provider, preferably after cleaning the surface of the blister. Large friction blisters should be treated by a medical professional.
- Materials like moleskin or commercial hydrocolloid blister-plasters may be applied to minimize additional trauma to the blister and to relieve discomfort.
- If the person must walk to access help, avoid using a very sticky dressing, such as a commercial hydrocolloid blister-plaster, as these are difficult to remove from the skin. Removing the blister-plaster repeatedly can cause further damage. Walking for extended periods also may allow bacteria to get under the blister bandage, increasing the risk of infection.
- Treat an open friction blister as a cut or graze.

Chain of survival behaviours

Prevent and prepare

- Before starting the activity, wear shoes that are well-fitting and do not rub. Protect the parts of the feet or hands that are likely to rub by using a barrier over those areas. This may include wearing dry socks or gloves, or taping parts of the feet or hands.
- Carry appropriate dressings if doing an activity likely to cause blisters.
- Repetitive activities increase the risk of blisters. Frequently check the areas of the skin most likely to rub. Minimizing repetitive actions can decrease the chance of significant friction blisters.

Early recognition

- The person has been doing an activity likely to cause continuous rubbing or pressure for some time, which would irritate the skin.
- A small pocket of fluid can be seen in the upper layers of skin caused by the friction.
- Many blisters will self-drain if hands and feet continue to be used.

First aid steps

1. Wash the blister and the surrounding area with clean water and gently pat it dry.
2. If the blister is intact, cover it with moleskin or a blister pad. If the blister has self-drained, clean the wound and cover it with a sterile dressing. A layer of moleskin or tape on top of the dressing may help provide further padding if the person must walk on the blister.

Access help

- Seek medical advice:
    - if the blister becomes an open wound or shows signs of infection, such as becoming hot and more painful
    - if the person has diabetes or their immune system is compromised. In these people, wounds are more likely to become infected or have trouble healing.

Recovery

- Monitor the blister over several days to check for signs of infection (such as heat, continuous pain or onset of fever). If these appear, seek medical care immediately.

Education considerations

Facilitation tips

- Include friction blister education for learners planning a wilderness expedition or an endurance activity such as a long-distance walk.
- Emphasize prevention and preparedness, as this is the most effective strategy for managing blisters.
- Explore the local dressings that support preparedness for blisters.
- Emphasize early recognition and early first aid to reduce pain.
- Education may also cover the removal of dressings and how to cause the least amount of damage to the blister. Soaking or using adhesive removal sprays may make removing dressings easier.

Scientific foundation

Systematic reviews

The Centre of Evidence-Based Practice (CEBaP) updated three evidence summaries in 2023 concerning deroofing or aspirating friction blisters, second skin bandages and the use of specific products (creams, sprays, plasters) to prevent blisters. The review identified two experimental studies about blisters due to burns, which provided indirect evidence on the management of friction blisters.

Deroofing or aspiration

There is limited evidence from one non-randomized controlled trial in favour of keeping a blister intact. It was shown that keeping a blister intact resulted in a statistically significant decrease in bacteria (or Staphylococcus aureus) colonization, compared to aspirating or deroofing a blister.

In addition, there is limited evidence from one randomized controlled trial in favour of aspiration at the level of the subjective pain experience. It was shown that aspiration of large blisters (greater than 10 mm) resulted in a statistically significant decrease in the subjective pain experience, compared to the deroofing of large blisters. However, this could not be shown for small blisters.

At the level of infection risk, it was shown that aspiration of blisters resulted in a statistically significant decrease of blister colonization with Staphylococcus aureus, compared to the deroofing of blisters. However, a statistically significant decrease in blister colonization with bacteria in general or an increase in wound healing could not be demonstrated when comparing aspiration with deroofing.

All evidence is of very low certainty and results cannot be considered precise due to limited sample size, low number of events, and large variability of results.

Second-skin bandage

In a second evidence summary, no studies were identified on the effectiveness of second skin bandages.

Prevention

There is limited evidence from a non-randomized controlled trial in favour of using a spray (antiperspirant) to prevent blisters (compared to a placebo spray). In two smaller studies, the use of an antiperspirant spray and an antiperspirant combined with substances that soothe the skin (emollients) did not result in fewer blisters.

In a small cohort study and a non-randomized controlled trial (within-subjects design) with participants in an ultramarathon, it was shown that taping resulted in a statistically significant increased risk of getting blisters. In another within-subjects study, this could not be demonstrated. The evidence is of very low certainty.

Non-systematic reviews

Limited research has been conducted to examine different prevention and treatments for friction blisters (Brennan et al., 2012; Levy et al., 2006; Lipman et al., 2014; Knapik et al., 1995). Most

studies have been performed within the military or among athletes who were mostly similar in age and physical activity levels, with a primary focus on the prevention of blisters (Janssen et al., 2018).

Darker skin appears to be less flexible, potentially reducing the risk of blisters. Research also shows that women are at higher risk than men. Possible explanations include that women take more steps over a given distance compared to men and have a different (softer) skin type (Knapik et al., 1999).

The existing body of literature addressing friction blisters includes some narrative reviews. Most notable among these narratives is that published by Knapik et al. in 1995, who included a detailed overview of the factors influencing blister formation and recovery. Foot friction blisters are caused by repetitive shear deformation, or when friction causes the skin layers to stretch and distort as they slide past each other. The three fundamental elements of blister formation are (1) bone movement, (2) high friction force, and (3) repetition of the resulting shear events. Minimizing any of these three elements can potentially reduce the risk of friction blisters. The first element of bone movement has largely been ignored or unrecognized, especially regarding its potential for preventing blisters. The second element, friction, must be clarified because its role in blisters is based on the lack of movement where the skin and footwear meet. Finally, the third element, repetition, should be acknowledged as one that can be controlled and adjusted to reduce the risk of blister injury (Rushton & Richie, 2024).

Blister prevention includes wearing properly fitting shoes and keeping the skin dry, as moist skin is more vulnerable. High-quality, dry socks are important (Jagoda et al., 1981). Being aware of the potential for blisters and checking common friction areas frequently for moisture, creases in socks or foreign bodies against the skin may aid in preventing blisters from forming. A cross-sectional study of the Arbaeen pilgrimage in Iraq, in which millions of people participate by walking 80 kilometres, concluded that wearing proper footwear and regular foot care are essential to prevent foot blisters. The type of foot covering and the distance walked were significantly associated with the number of foot blisters (Kachoei et al., 2025). This consents to early recognized measures to prevent blisters as described by examples in the publication written by Vonhof (2021).

Pre-taping the feet with adhesive tape might prevent friction blisters. The success of taping relies on keeping the tape well-adhered to the skin. However, there are no published studies to show these measures work (Richie, 2010). In fact, two studies identified in the evidence review above found an increased risk of blisters when taping the feet. The selection of tape and taping method is an individual choice. Surgical paper tape was not found to be particularly protective against blisters in marathoners, although this intervention was well tolerated and had high user satisfaction (Lipman et al., 2014).

Clinical experience suggests that draining intact blisters and maintaining the blister roof results in the least discomfort and may reduce the possibility of secondary infection. Treating deroofed blisters with hydrocolloid dressings provides pain relief and may allow individuals to continue a physical activity if necessary. Commercial hydrocolloid blister-plasters can be very helpful and come in several sizes and shapes. Apply these according to the instructions. Avoid using commercial blister plasters for longer distances, as blisters can still form, and the plaster can be

very difficult to remove from damaged skin. Clinical trials are needed to determine the efficacy of various blister treatment methods. Antibiotic ointments are advocated for the immediate treatment of friction blisters. There is no published evidence that these measures are of any benefit in healing or preventing infection (Knapik, 1995).

Additionally, materials like moleskin may be applied to minimize additional trauma to the blister and to relieve discomfort (Schwartz, 2023); however, no studies are available to prove the effectiveness of second skin bandages.

Because the skin provides natural protection against infection, friction blisters on the foot should be left intact if possible. They usually require simple first aid, such as a bandage to protect the blistered area. Blisters can, however, lead to increased discomfort, an open wound, bleeding or infection, and limit individual mobility. In this situation, first aid providers should focus on further blister management and pain reduction (Van Romburgh, 2025). For example, during the annual Nijmegen Four Days Marches in the Netherlands, the world's largest multi-day walking event with daily distances ranging from 30 to 50 kilometres (roughly 18 to 30 miles), the need for treatment of friction blisters is very high. In previous years of the Four Days Marches, the number of participants requiring at least a single blister treatment varied between 4,000 and 5,000, accounting for 10% of the total number of walkers (Janssen et al., 2018).

Because the pain from a friction blister is caused by pressure from the built-up fluid, draining a fluid-filled blister will immediately reduce the associated pain. Evidence for blister management and pain reduction suggests puncturing a blister and using adhesive surgical tape. Only one evidence-based study from the Four Day Marches recommends taping the blister and part of the foot (Roos, 1954). The high-quality viscose backing material is hygienic and resistant to tension. The purpose of the bandage is to ensure that the blister roof adheres to the underlying skin and that it does not refill with fluid after drainage. Though puncturing and taping have proved effective in the past, it is time-consuming. In the case of the Four Days Marches or other events like it, this can lead to long wait lines and disrupt the walking rhythm of those taking part in the event (Janssen et al., 2018).

Clean the entire footpad to remove any grease; this allows the adhesive plaster to attach better. Blisters can best be disinfected with povidone-iodine or chlorhexidine before and after puncturing. Let the disinfectant dry prior to puncturing the blister. Never puncture a blister through a dressing, as you cannot see the blister, and it is unhygienic (Gonzalez de la Guerra & González Campo, 2013).

Removing a bandage can damage the blister. It is best to carefully remove the bandage by hand. Do not pull it off the skin all at once; instead, remove it very gently in sections while supporting the skin. Hand removal is better than using white spirit. White spirits are irritating to the skin. If you choose to use white spirit to remove any adhesive residue, use it with caution. Ensure the white spirit does not come into contact with an open blister or wound.

In addition to the white spirit, various types of adhesive remover sprays or tissues are also available. They do not contain alcohol and will not irritate the skin (Van Romburgh, 2025).

Burns

Key action

Cool thermal burns with running water for at least 10 minutes, ideally 20 minutes.

Introduction

Four of the main causes of burns are heat (fire, steam), chemicals (acid), radiation (radioactive materials, the sun, sunlamps) and electricity. Mild burns in adults generally do not require medical care; however, even burns that appear small or mild can be very harmful to a baby, child or the elderly. The depth and size of the burn determine its severity. It is important to note that even after being removed from the burn source, the burning process can continue in the layers of the skin.

Guidelines

Thermal burns

- Thermal (heat) burns should be cooled with running water for a minimum of ten minutes, ideally 20 minutes.**
- After cooling, vaseline or honey may be beneficial substances to apply to a thermal burn.*
- Aftersun lotion (Hamamelis-free lotion), aftersun cream (e.g. aloe vera cream), or aftersun gel (diclofenac 0.1% Emulgel) can be applied to sunburn according to the instructions and may help reduce pain.*

Chemical burns

- Chemical burns on the skin or in the eyes should be rinsed with running water and, if available, a solution (e.g. Dihoterine) that neutralizes and removes harmful chemicals from the area. Rinse the area until the pain eases.*

Aftercare

- After cooling, a dressing that maintains moisture, contours easily to the wound and is non-stick (e.g. hydrogel) should be used on burns.**
- Silver sulfadiazine should not be used because it seems to be associated with poorer healing outcomes than other treatments.*
- Blisters should not be deroofed or aspirated, as this may increase the risk of infection. If they affect the function of the injured body part, the person should consider seeking medical advice. See Friction blisters.*

Good practice points

- When possible and safe to do so, the source of danger should be dealt with to prevent further injury. For example, cover a pot of hot oil.
- The first aid provider should avoid direct contact with any chemical substances.
- If rinsing a chemical substance from the skin, the first aid provider should take care that any diluted substance does not harm healthy tissue.

- Potable (clean) water should be used to rinse out eyes that have had contact with a chemical substance.
- If a chemical substance was ingested, do not make any attempt to dilute it. Access the poison control centre, emergency medical services (EMS) or local equivalent. See Poisoning.
- If cold running water is not available, any cold liquid can be effective in cooling thermal burns (e.g. juice, milk).
- As long as they are not stuck to the skin, clothing and jewellery on or near the burned skin should be removed to support treatment and reduce further discomfort.
- Covering a burn with a clean wet cloth or plastic cling wrap can protect it during transit to medical care. Cover rather than wrap an extremity as it may swell.
- If the burn is large, deep or close to the face, mouth/throat or genital area, or if it is the result of chemical products, electricity or flames, the first aid provider should access EMS.
- If warmth or pain develops around the burn area, or the person develops a fever, this is an indication of infection and the person should seek medical advice immediately.
- After cooling the burned area, honey, aloe vera or banana leaves can be used for aftercare.
- Young children with thermal burns being actively cooled with running water should be monitored for signs and/or symptoms of excessive body cooling.

Chain of survival behaviours

Prevent and prepare

- If possible, try to avoid cooking at floor level. If cooking at floor level, ensure small children and babies are supervised and kept away from the fire (Bitter & Erickson, 2016; Forjuoh, 2006).
- Be cautious when using kerosene and heating devices as these can cause burns.
- Keep clothing away from flames and intense heat sources. Ensure the safe handling of pressure stoves and coal-burning stoves. Construct kitchens safely, taking into account the proximity of electric cables and fireplaces (Ghosh & Bharat, 2000).
- Place fire safety equipment (e.g. extinguishers, fire blankets or the local equivalent) in high-risk areas, such as the cooking area, to limit the spread of fire and potential harm.
- Cover skin with long clothing, sunscreen (SPF 30 or more) or zinc oxide when in the sun.
- Avoid long periods in the sun. Choose a time of day to be outside when there is more shade.
- Wear protective equipment (e.g. gloves) when using chemical substances or hot objects.
- Review safety information on chemical products before use.

Early recognition

- Thermal burns caused by direct contact with a source of heat or chemical burns will immediately be sore and the skin may react with blisters or irritation after contact with a chemical.
- The injured person may tell you or indicate they have been burned.
- Burns vary in size and depth. Do not delay treatment. There are several methods used to recognize the severity of a burn such as the Wallace scale; however, we have no evidence on which is most effective.

- Sunburn can occur quite quickly or over a longer period. The person may not notice they are getting sunburned until they see a change in their skin colour or realize the area is painful.
- Note the age of the person and the location of the burn, as these will impact the severity of the burn.
- Be aware that burns may appear different on different skin tones.

First aid steps

1. Cool the burn with clean running water for at least 10 minutes, ideally 20 minutes.
2. Access EMS if the burn is large, deep or close to the face, mouth, throat or genital area, or if it is the result of chemical products, electricity or flames.
3. As long as they are not stuck to the skin, remove any clothing and jewellery on or near the burned skin. It will be much harder to remove jewellery once the inflammatory process has set in.
4. After cooling, cover the wound with a dressing that maintains moisture, contours easily to the wound and is non-stick (e.g.hydrogel).
5. If necessary, cover the burn with a wet cloth or plastic cling wrap while transporting the person to medical care.
6. Reassure the person and monitor their responsiveness, breathing and temperature, especially if it is a child or a vulnerable person (e.g. older adult, person with diabetes).

During cooling, letting the water flow over the burn may be more comfortable for the person than aiming the water flow directly on top of the burn. Do not use ice-cold water, as this may lead to hypothermia, particularly in children or in the case of large burns.

Do not apply ice, as this may aggravate the injury.

For burns on the fingers, place a clean, moist cloth or sterile gauze between the fingers to keep them from sticking together. This is especially important for severe burns.

If the burn has blisters, leave them intact and seek medical advice.

If the burn is large, there is a risk that the person will develop Shock. To help a person with shock, it is necessary to assist them to lie down and keep them warm. If possible, prevent the burn from coming into contact with the ground to keep the burn clean.

Local adaptation

- If there is no running water available, use alternative cool liquids (juice, milk) to cool the burn.
- If water or other liquid is in short supply, put a bowl under the burn and pour the liquid over the burn into the bowl so that the water can be used again. This is more effective than putting the burn into the bowl of water as the body part will warm the water. Pouring it keeps the water temperature lower.
- If there is no dressing available, use locally available substances such as aloe vera, honey or banana leaves to dress the burn.

Chemical burn to eye

- In the case of a chemical burn to the eye, immediately rinse the eye with sterile saline eye wash devices or clean running water. If only one eye is injured, be careful not to contaminate the other eye when rinsing.
- Remove any contact lenses during the rinse.
- When rinsing a chemical substance, take care that the now diluted substance does not harm you or the person's healthy tissue by making contact with unaffected skin or the uninjured eye.
- Use diphoterine for cooling if available, following the instructions on the container.
- Do NOT apply any other products without consulting medical care.

Sunburn

- Apply aftersun lotion according to the instructions.
- If the sunburn is extensive or if it happens to a baby or a vulnerable person (e.g. older adult, person with diabetes), access medical care as quickly as possible.

Access help

- If the burn is large, deep or close to the face, mouth, throat or genital area, or it is the result of chemical products, electricity or flames, access EMS or the nearest medical care.
- Seek medical advice if the burn happens to a baby or a vulnerable person.
- In the case of a chemical burn to the eye, be aware that the person will need some assistance. They should not drive a vehicle themselves.

Recovery

- Monitor for signs of infection. If warmth or pain develops around the site of the burn, seek medical advice.

Education considerations

Context considerations

- Prevention is the key focus when facilitating the topic of burns. Consider the learners' context, identifying the source of burns they are most likely to experience and adapt the prevention material accordingly (Wallace et al., 2013). For example, learners who live in hot countries could focus on how to prevent sunburn.
- In addition to prevention methods, consider re-focusing the education to best suit learners' needs. Learners who work in professional kitchens, or who cook on open fires may benefit most from learning the first aid actions to treat a burn (Forjuoh, 2006; Outwater et al., 2018). In contrast, those who are in remote or resource-limited settings (such as wilderness) will need to develop critical thinking skills to make use of their surroundings to treat a burn (Bitter & Erickson, 2016).
- Developing contextual education that considers the local environments in which learners live and work (and therefore what resources and immediate help are accessible to them) is useful for teaching about burns (Bitter & Erickson, 2016; Outwater et al., 2018).
- While using running water is the most effective treatment for burns, encourage learners to consider alternative methods in situations where they do not have access to water.

- The first aid treatment of burns varies across communities and, in some cases, is influenced by strong cultural traditions. Acknowledge these traditions and explore the different types of local treatments with learners. Be careful not to dismiss local remedies for which there is no evidence. Build on the traditions and local treatments and connect learners' knowledge with additional, positive treatments that will reduce harm and provide comfort to the person with a burn.
- In communities with a high frequency of burn injuries, deliver frequent, shorter burn-specific first aid courses to ensure learners maintain their knowledge and skills. Another option is to develop a peer-education programme.

There are many ideas on treating and providing follow-up care for burns. Emphasize evidence-based practices and respectfully avoid any practice that might increase the risk of infection.

Learner considerations

- Acknowledge and correct any myths or incorrect information associated with burns, such as the incorrect belief that only white skin can be sunburned. The use of sunscreen and staying out of the sun for long periods is an important preventive measure for all ethnicities and skin types to reduce the risk of burning and getting skin cancer.
- For caregivers of babies, children or older adults, emphasize that they should focus cooling on the site of the burn only, to reduce the risk of hypothermia.
- Burns (like other injuries) could be caused intentionally by others or by the person such as in situations of physical abuse and self-harm. This is an important point to make to learners who may be caregivers or teachers. Such cases need to be handled with care and referred to the appropriate professionals if needed.

Facilitation tips

- Establish what learners already know about how to treat burns and uncover any strong beliefs. This information will help identify any knowledge gaps as well as any non-evidence-based practices or misconceptions (e.g. putting butter or cooking oil on a burn).
- Emphasize that cooling the burn is critical to reducing any potential tissue damage. The burning effect continues even after the skin has been removed from the source of heat so cooling should take place quickly and for a sustained time (10 minutes minimum).
- Explore how burns look on different skin types and colours.
- Provide learners with time to practise making the person comfortable while cooling their burn. While the recommended time to cool a burn is specific, this may present a challenge if the person does not want to cooperate. Children, in particular, find it hard to sit still and the cold water can start to cause them pain.

Facilitation tools

- In 2017, the Belgian Red Cross-Flanders updated the manual Basic First Aid for Africa (revised in 2016), which has some interesting material on prevention and when to seek medical help regarding burns (Belgian Red Cross-Flanders, 2017).

Learning connections

- Hypothermia and shock are both conditions that might develop following a burn.

Scientific foundation

Systematic reviews

The scientific foundation for this section is based on a 2015 evidence review and 2020 scoping review from the International Liaison Committee on Resuscitation (ILCOR) First Aid Task Force, evidence summaries from the Centre of Evidence-Based Practice (CEBaP, 2019; CEBaP, 2020), and a Cochrane review.

Cooling

ILCOR identified one randomized controlled trial and four observational studies in a 2015 evidence review (Singletary, et al., 2015; Zideman et al., 2015). Based on one randomized controlled trial and one observational study, no difference in pain could be shown in cooled versus non-cooled burns (low-certainty evidence). In the randomized controlled trial, a difference in the amount of erythema could not be shown (low-certainty evidence). Two observational studies showed a reduction in the depth of a burn when cooling, whereas a third observational study found no benefit of cooling (low- to very low-certainty evidence). In one observational study, no benefit in reducing re-epithelialization time was shown (very low-certainty evidence). Three observational studies looked at the need for medical care. Two studies showed a decreased length of hospital stay after a minimum of 10 minutes of cooling, and a decrease in hospital admission after a media campaign about the cooling of burns, whereas the third study showed no difference (very low-certainty evidence). In addition, in 2021 ILCOR published a systematic review about the optimal duration of cooling (Wyckoff et al., 2021; Wyckoff et al., 2022a; Djärv et al., 2022) and identified four observational studies. For the outcome of burn size, no significant difference was shown when cooling a burn for 20 minutes compared with cooling for less than 20 minutes (very low-certainty evidence). When it comes to the degree of the burn, inconsistent evidence was found. ILCOR concluded that a specific duration of cooling cannot be recommended at this time.

Ice

A Centre of Evidence-Based Practice (CEBaP) evidence summary revealed there is limited evidence from one observational study, either in favour of using ice or of no treatment. A statistically significant decrease in the need for grafts, scar management, days to re-epithelialize or the number of visits, using ice compared to no treatment, could not be demonstrated. Evidence is of very low certainty and results cannot be considered precise due to a low number of events, limited sample size and large variability of results. The updated evidence summary did not identify any new studies.

Deroofing

A CEBaP evidence summary shows that there is limited evidence from one non-randomized controlled trial in favour of keeping a blister intact (i.e. not removing the top layer of skin from the blister). It was shown that keeping a blister intact resulted in a statistically significant decrease in bacteria or Staphylococcus aureus colonization, compared to aspirating or deroofing

a blister. Evidence is of low certainty and results cannot be considered precise due to limited sample size, the low number of events and lack of data. The updated evidence summary did not identify any new studies.

Burn dressings

A scoping review conducted by ILCOR in 2020 identified no studies on burn dressings in the first aid setting for superficial thermal burns (Markenson et al., 2019). Additionally, a Cochrane review was identified that reported on the use of dressings for superficial and partial-thickness burns (Wasiak et al., 2013). Silver sulfadiazine was consistently associated with poorer healing outcomes compared to biosynthetic (skin substitute) dressings, silver-containing dressings and silicon-coated dressings. It was also reported that burns treated with hydrogel dressings appeared to heal more quickly than those treated with usual care. The review authors concluded that it was impossible to draw firm and confident conclusions about the effectiveness of specific dressings. A follow-up systematic review by the same group (Goodwin et al., 2015) did not find any studies on the use of hydrogel-based burn dressings in first aid practices in the prehospital setting.

Alternative burn dressings (honey, fatty acids, banana leaf dressings, vaseline)

An updated 2024 CEBaP evidence summary includes a Cochrane systematic review and four additional randomized controlled trials about the use of honey to treat burns. No additional studies were identified during the update. It was shown that honey resulted in a statistically significant decrease in the mean time to healing and incidence of infection compared to conventional non-antimicrobial dressings. It was also shown that honey resulted in a statistically significant decrease in time to complete healing, presence and completion of epithelialization, hospital stay, persistent infection and time until negative swabs compared to silver sulfadiazine. A statistically significant decrease in the mean time to healing, number of healing events, incident infection, clinical infections or adverse events, using honey compared to silver sulfadiazine, could not be demonstrated. Finally, it was shown that honey resulted in a statistically significant decrease in time to complete healing, mean time to healing and persistent infection compared to potato peelings. A statistically significant decrease in adverse events was not demonstrated when using honey compared to potato peelings. Evidence is of moderate to low certainty and results cannot be considered precise due to limited sample size, a low number of events, lack of data or large variability of results.

Updated in 2024, an additional CEBaP evidence summary identified evidence about the use of fatty acids and banana leaf dressings as burn dressings. There is limited evidence from one non-randomized controlled trial in favour of fatty acids (ethyl linoleate). It was demonstrated that adjuvant topical application of ethyl linoleate led to a statistically significant decrease in the requirement for narcotic pain relief, the time to appearance of epithelium, the appearance of normal pigment and hair and the number of patients requiring grafts compared to standard burn management. A statistically significant decrease in length of hospital stay, amount of positive cultures, the number of patients requiring reconstructions and mortality, using adjuvant ethyl linoleate compared to standard burn management, could not be demonstrated.

There is limited evidence from two non-randomized controlled trials and one cohort study in favour of banana leaf dressings. It was shown that banana leaf dressings resulted in a statistically

significant decrease in discomfort score, dressing removal pain score, intake of pain medication and time to complete healing, and an increase in ease of dressing removal and satisfaction with dressing method, compared to using ordinary gauze dressings. In another study, it was shown that banana leaf dressings resulted in a statistically significant decrease in discomfort score 20 minutes after dressing and in pain score before dressing. A statistically significant decrease in discomfort score before and during dressing, as well as a pain score during and after dressing, could not be demonstrated. A statistically significant decrease in signs of wound infection or length of hospital stay, using banana leaf dressings compared to ordinary gauze dressings could not be demonstrated. A statistically significant difference in complete epithelialization, need for skin grafting, dressing change pain and discomfort using banana leaf dressings compared with boiled potato peel dressings could not be demonstrated. All evidence is of very low certainty and results cannot be considered precise due to limited sample size, the large variability of results and lack of data.

Another CEBaP evidence summary, updated in 2024, revealed there is limited evidence from one randomized controlled trial and one cohort study in favour of using vaseline. It was shown that vaseline application resulted in a statistically significant decrease in time to re-epithelialization, adherence to the wound and time to change the dressing, and a statistically significant increase in ease of dressing removal compared to silver sulfadiazine covered with a gauze. A statistically significant decrease in pain during dressing application, pain during dressing removal, amount of dressing changes and infection rate using vaseline compared to silver sulfadiazine or polysporin covered with gauze could not be demonstrated. The evidence is of very low certainty for the outcome of infection rate and of moderate certainty for all other outcomes. The results cannot be considered precise due to the limited sample size.

Plastic cling wrap

A 2024 CEBaP evidence summary identified one randomized controlled trial on the use of cling wrap or plastic film on burn wounds. A statistically significant decrease in pain and days to re-epithelialization could not be demonstrated when comparing plasticized polyvinylchloride film (clingfilm) with burnaid hydrogel. This suggests that clingfilm may be as effective as hydrogel dressings for the temporary coverage of burn wounds until specialized care is available. However, the certainty of the evidence is low, as the findings are based on a small sample size and show considerable variability.

Chemical burn

A CEBaP evidence summary showed that there is limited evidence from two observational studies in favour of immediate irrigation of the burned skin with tap water or diphoterine. It was shown that immediate irrigation with tap water resulted in a statistically significant decrease in length of hospital stay and number of full-thickness burns, compared to no immediate irrigation with tap water or irrigation with saline, isotonic phosphate buffer or Ringer's lactate. It was also shown that irrigation with diphoterine resulted in a statistically significant decreased proportion of severe burn wounds, compared to irrigation with tap water. Evidence is of very low certainty and results cannot be considered precise due to low sample size, a low number of events, large variability in results and a lack of data. The updated evidence summary did not identify any new studies.

A second CEBaP evidence summary revealed that there is limited evidence from three observational studies in favour of immediate irrigation of the burned eye with tap water or diphoterine. It was shown that immediate irrigation (with tap water) resulted in a statistically significant decrease in the proportion of severe burns, corneal and conjunctival erosion, time until healing less than seven days and the number of eye operations needed, and a statistically significant increase in clear vision and the proportion of mild eye injuries, compared to no immediate irrigation (with tap water) or irrigation with saline, isotonic phosphate buffer or Ringer's lactate. A statistically significant difference in the proportion of severe burn wounds after irrigation with tap water, compared to irrigation with diphoterine, could not be demonstrated. Additionally, a statistically significant difference in the proportion of conjunctivitis or superficial punctate keratitis was not demonstrated between immediate irrigation and no immediate irrigation. Evidence is of very low certainty and results cannot be considered precise due to low sample size, a low number of events and large variability in results. The updated evidence summary did not identify any new studies.

There is no evidence summary available on what to do if a chemical substance is ingested.

Sunburn

A 2019 evidence summary from CEBaP found limited evidence from four experimental studies in favour of aftersun lotion and aftersun cream, and from two experimental studies in favour of aftersun gel. The evidence was declared stable and the evidence summary was therefore not updated.

It was shown that aftersun lotion (Hamamelis-free lotion) and aftersun cream (aloe vera cream) resulted in a statistically significant reduction in erythema (48–54 hours after sun exposure) compared to a placebo lotion or cream or no treatment. On the other hand, in two studies using aftersun cream (aloe vera cream), a statistical erythema reduction 24 hours after sun exposure, compared to placebo or no treatment, could not be demonstrated. Evidence is of low certainty and results cannot be considered precise due to limited sample size, the low number of events and a lack of data.

It was shown that aftersun lotion with 0.1% diclofenac resulted in a statistically significant reduction in erythema and pain, compared to a placebo gel (Kienzler et al., 2005; Magnette et al., 2004).

Evidence is of moderate certainty and results cannot be considered precise due to limited sample size.

Education review

We initially sourced 13 papers through the education search strategy for this topic, of which we included seven. Expert reviewers added a paper, bringing the total to eight. These include the following:

- one systematic review from Nurmatov et al. (2017)
- two literature reviews from Bitter et al. (2016) and Forjuoh et al. (2006)
- one mini meta-analysis of studies from Tanzania by Outwater et al. (2018)

- four studies on knowledge and awareness from Alomar et al. (2016), Ghosh and Bharat (2000), Graham et al. (2011) and Wallace et al. (2013).

Language

Nurmatov et al. (2017) identified that awareness, knowledge and practice of burn first aid skills is low among caregivers worldwide; many people either do not cool the burn properly or do not cool it long enough. Public messaging adds to the confusion by providing a variety of recommendations and guidelines. This confusion was evident across the papers we reviewed where each had different "ideal" burn treatments. The review found that when public messaging appears in the local language, knowledge and behaviour change is possible. It concluded that communities with diverse languages need health messaging in each language to promote taking first aid action, quickly accessing help and reducing the use of harmful treatment alternatives.

Limited resource settings

A literature review by Bitter et al. (2016) described how, in remote communities, people had evolved self-care treatments for burns based on experimental familiarity with nature and plants. In particular, where access to clean running water may be unrealistic, first aid providers may need to adapt first aid principles. While the use of traditional remedies has a variable evidence base and may be sub-optimal, teaching those living, working or visiting remote settings about improvised remedies is important when advanced treatments are not available.

Outwater et al. (2018) provided a perspective from Tanzania on the importance of cooling a burn as early as possible. They focus on the adaptability of providers, emphasizing the need for them to feel knowledgeable and empowered to use safe and appropriate alternative methods to cool a burn when clean, running water is unavailable. Outwater found that most burn injuries in Tanzania occur in the home cooking area, and most first aid providers are family members, friends and neighbours. Information on burns was most likely to come from these sources, and less often, from healthcare workers or the media. The study interviewed 710 people with burns and looked at 24 different materials that had been applied to their wounds. The most common material was honey. Only 14.3% of people received the recommended form of care (application of running water). The study also found that 17.5% of people received nothing for their burns.

The study highlighted that first aid providers are very aware that burns must be cooled; however, there is still a great need to contextualize education and instill confidence to respond in communities where the availability and accessibility of clean running water may be limited. For example, suggesting the use of cold honey and emphasizing the need to keep the burn site clean while monitoring for infection are important educational adaptations.

Influence of culture and traditions

Graham et al. (2011) identified significant differences in first aid knowledge between different ethnicities attending the emergency department for burns treatment in the United Kingdom (UK). The difference could be attributed to a lack of education in the languages of immigrants needing to learn about the UK healthcare system.

Ghosh and Bharat (2000) conducted a review of a burns awareness strategy spanning several years in a steel-producing town in India. The study found that before the awareness strategy began, the majority (68.5%) of patients admitted for burns were due to kitchen accidents, mostly of women and girls whose clothes caught fire while working in the kitchen. Inappropriate treatments, such as egg or oil, were common. They undertook a strategy which included school and community education programmes aimed at affecting generational behaviour change. It included education about the structure of kitchens, as well as behaviour. Unfortunately, there has been no strong evaluation of the different approaches used, making it difficult to identify what has worked and what has not. Overall, the strategy is seeing some success.

Alomar et al. (2016) surveyed caregivers attending four paediatric clinics in Riyadh, Saudi Arabia, using a structured questionnaire on first aid burn knowledge and the care they provided. Results showed that 41% treated the burn with water, although 97% had inappropriate or no knowledge of the recommended duration. 65% covered a pot of boiling oil that was on fire with a damp cloth, but only 24% smothered burning clothes. Using questions about where first aid providers acquired their knowledge and where they preferred to get it, the study concluded that social media and TV, as well as information provided at hospital visits, were preferred. The authors also noted a need for a nationwide education programme to raise awareness of what to do for burn emergencies.

Context-specific learning

Wallace et al. (2013) conducted a cross-sectional study using convenience sampling among members of sporting and recreational clubs in Australia. The primary outcome measure was the proportion of correct responses to multiple-choice questions relating to the following four burn scenarios: scald, contact burn, ignited clothing and chemical burn. This article reinforces the evidence of the importance of first aid education that is tailored and responsive to the needs of specific audiences based on their potential experiences.

Forjuoh et al. (2006) provided a literature review to determine burn prevention understanding based on who gets burned and what are the causes. The review identified a common thread of characteristics, such as seasons (fewer fires or heating provisions in hotter climates) and gender (a higher instance for boys up to four years, and then a higher instance for girls as they are brought in to help in the kitchen). It found that risk factors are very context-based. Common themes in risk-based prevention included socio-economic factors, maternal education, housing improvements and increased access to water. More studies are needed to ensure data are used for targeted prevention according to the context and local practices.

Flash eye

Key action

Protect the eyes and let them rest.

Introduction

Flash eye, also called snow blindness or arc eye, is a painful condition in the eyes caused by overexposure to ultraviolet (UV) light. It is like the cornea (the transparent outer layer of the eye) has a sunburn. Flash eye is most likely to happen to people who take part in outdoor sports or activities in relatively high altitudes or at sea, where surfaces reflect light into the eyes. At high altitudes, there is less air to filter light and so it is much more intense. Man-made sources of UV radiation, such as a welder's torch or sun lamps, have the same effect.

Good practice points

- If applicable, the person should remove their contact lenses.
- The person should protect their eyes and let them rest as much as possible, by:
    - staying indoors and wearing sunglasses to relieve pain or discomfort
    - keeping their eyes closed as much as possible
    - covering their closed eyelids with a cool, damp cloth.
- The person's eyes should stay moist (e.g. using saline solution or eye drops).
- The person should avoid rubbing their eyes.
- If symptoms last longer than a day or if they worsen, the person should seek medical advice.

Chain of survival behaviours

Prevent and prepare

- Wear protective eye gear when in the sun or undertaking tasks that expose the eyes to UV light. Protect the eyes from direct or indirect radiation that might reach them from above and below, as well as sideways.

Early recognition

The person may have:

- a feeling that something is in their eyes
- a burning sensation in their eyes
- blurred or loss of vision
- red and watery eyes
- sensitivity to light
- headaches
- swelling around the eyes.

First aid steps

1. Move the person away from the source of light and reassure them.

2. If they are wearing contact lenses, advise them to remove them.
3. Help them protect their eyes and let them rest as much as possible by:
    a. staying indoors and wearing sunglasses to relieve pain or discomfort
    b. keeping their eyes closed as much as possible
    c. covering their closed eyelids with a cool, damp cloth
    d. putting saline solution or eye drops in their eyes to keep them moist.
4. If their condition does not improve in 24 hours, seek medical advice.

Access help

- Flash eye usually passes, but if it lasts longer than a day or the symptoms worsen, access medical care.

Education considerations

Context considerations

- Learners who are at a higher risk of flash eye, for example, those who weld, work with or use sunbeds or spend time in the snow or at the sea, may benefit from learning about this topic.
- Use relevant or local terminology for this condition. For example, welders may refer to the condition as arc eye (or flash eye), whereas learners who spend time in the snow may call it snow blindness.

Facilitation tips

- Emphasize that flash eye is not limited to areas with snow. It can occur in any setting with high levels of UV light, such as near water, sandy beaches or in areas with ice, as well as in certain work environments (e.g. welding).
- Emphasize that prevention includes wearing proper eye protection (e.g. wearing sunglasses outside to filter UV rays).

Scientific foundation

A Centre for Evidence-Based Practice (CEBaP) evidence summary on the use of wet dressings as first aid treatment could not identify any relevant studies (CEBaP, 2024).

Prevention

A second evidence summary from CEBaP identified limited evidence from three observational studies in favour of wearing eye protection. The studies showed that wearing eye protection resulted in a statistically significant decrease in work-related eye injuries, compared to not wearing protection. The evidence is of very low certainty and results cannot be considered precise due to the limited sample size (CEBaP, 2019). The summary was considered stable and was therefore not updated.

Fractures, sprains and strains

Key action

Keep the injury still to reduce pain.

Introduction

Sprains and strains are considered minor injuries, while fractures can range from minor to major. While often not life-threatening, injuries to the extremities (arms, legs, fingers or toes) can lead to disabilities if left untreated. A fractured bone is often painful and can cause internal or external bleeding (when the broken bone breaks through the skin). If a long bone is injured, such as the femur, the bleeding from the bone itself can be life-threatening. See also spine injuries.

Good practice points

- Any injury to an extremity should be approached as a potential bone fracture.
- The injury should be stabilized to minimize any movement and pain either manually (e.g. self-splinting) or mechanically (e.g. using a sling and bandages).
- As soon as possible, first aid providers may ice or cool the sprained joint or soft tissue injury for up to 20 consecutive minutes, as this may decrease the pain. Cooling for longer than this may damage the skin.
- A compression dressing may be applied to a strain or sprain if this provides comfort.
- All fractures should be assessed for internal and external bleeding and the injured person treated for Shock, especially if the fracture involves long bones such as the femur.
- In situations where the injured person must be moved, and transport is expected to be bumpy or jarring, first aid providers should protect the limb (particularly a leg) by splinting. Splinting should be done in a way that limits pain, reduces chances for further injury and facilitates safe and quick transport.
- When in a remote environment (or one with limited resources) and the limb below the angulated fracture is cool, pale or the first aid provider is unable to splint for movement, the first aid provider may consider straightening it if trained to do so.

Chain of survival behaviours

Prevent and prepare

- Be prepared to care for fractures, sprains and strains in the context in which they occur. For example, sprains and strains are common in sports and it is advised to have cooling therapy equipment (e.g. ice packs) available. Conversely, if going on a trip to a remote location, find out about local rescue organizations and practise immobilizing limbs before the trip.

Early recognition

The person may have twisted a limb, fallen or taken a blow from an object.

The person may have:

- deformity, swelling, haematoma or bruising at the site of the injury
- pain and or difficulty in moving the body part
- shortening, twisting or bending of the limb
- a broken bone or bone fragments sticking out of the skin
- the sound of a snap or a pop when the injury happened
- a sensation or sound of bones grating.

First aid providers are not expected to be able to diagnose whether a person has a fracture or a sprain or a strain. The only accurate way to diagnose a fracture is with an X-ray. When in doubt, assume it is a fracture.

First aid steps

1. Help the person keep the injury still.
2. Support the injury in a comfortable position to prevent any movement. Keeping the limb elevated may help reduce swelling.
3. Apply ice or something cold for up to 20 minutes. Cooling for longer than this may damage the skin. Ask the person to rest.
4. Access emergency medical services (EMS) if the person has a lot of pain or swelling, signs of shock, the fracture is in the femur or if the limb is in an abnormal position.
5. Reassure the person and ensure they are comfortable.

- There are many instances when the use of ice or something cold may benefit bruising, strains, sprains, dislocations, haematoma, swelling or closed fractures.
- To be effective, the application of ice or something cold must be done as soon as possible after the trauma. Stop cooling if the person finds it too painful. If the pain returns and the skin's temperature has come back to normal, you may start cooling again.
- Dislocations and fractures should always be treated by a medical professional.
- If the injury is an open fracture, your priority is to stop the bleeding and limit infection. As for any fracture, stabilize the limb. Treat the person for Shock.

CAUTION

- Always wrap an icepack in a cloth to avoid damage to the skin.

Local adaptation

- In remote areas where the injured person must be moved a long distance over bumpy terrain, protect the limb by splinting it in a way that limits pain, reduces chances for further injury and facilitates safe and quick transport.

Access help

- If you are in doubt whether the injury is a fracture, sprain or strain, access medical care.
- Record the time of injury, as this information can be helpful for medical professionals when comparing the injured limb to the healthy one.

Recovery

- Mobilization exercises can help with recovery from a sprain or strain; however, avoid weight-bearing exercises as these could worsen the condition (CEBaP review, 2015).

Education considerations

Context considerations

- Ensure learners living in or visiting remote settings know how to contact local rescue organizations, follow local procedures and have the confidence and skills to care for a person with an angulated fracture.
- In contexts where learners may have to transport the injured person to a medical facility, practise improvising splints with local materials and emphasize how immobilization helps reduce pain and prevents the limb from further injury.

Learner considerations

- Those involved in sports or industrial activities may have more exposure to injured limbs and should know how to recognize fractures, sprains and strains and how to provide first aid care until a medical professional can take over.
- Older people may be more susceptible to falls and, therefore, sprains and fractures. Learners who care for older people may benefit from learning this topic.
- Some learner groups may benefit from learning how to take the peripheral pulse of the injured person and how to use their findings to identify more severe injuries. A weak pulse may indicate damage to the vessels or compression by a haematoma. While programme designers may consider including this in training, it should not deter learners from helping the injured person in other ways if they are unable to take a pulse properly.

Facilitation tips

- Facilitate discussions on learners' experiences with fractures, sprains and strains and expand on the learning outcomes as they come up in conversation. This may help build learners' confidence.
- Give learners time to identify the different types of trauma care available to them in their context and which would be the most appropriate one to access for a range of injury types.
- Identify misconceptions and dispel them. Common misconceptions include that "you can walk off" a sprain or strain (rest is advised initially), that you should apply alternating heat and cold therapy (only cold is recommended), that a fracture is easily identifiable (which it often is not), that "if you can stand on it or move on a limb, it must not be broken" (fractures often need an X-ray to confirm, and should not be walked on).
- Brainstorm as a group what you could use to improvise immobilization, such as a newspaper or wood for a splint or rolling your sweater up to support an arm. Also, brainstorm how you could find or improvise applying ice or something cold (e.g. icepacks, a bag of ice cubes).
- Spend time practising immobilization techniques. Emphasize that stabilizing the injury through support or immobilization may reduce pain and prevent further damage to nerves or vessels.

Facilitation tools

- Use items found in the learning environment to make improvised splints. Encourage learners to see what works best and what components are essential for a successful splint.
- Use scenario-based learning to practise accessing medical care and how to minimize pain during transport.

Learning connections

- Connect this topic to managing severe bleeding and caring for shock.
- Someone with a fracture is likely to be in a lot of pain. Help learners connect their first aid actions with care, empathy. Psychological first aid skills or the topic, traumatic event, may be relevant.
- This topic may offer good opportunities for learners to practise their General approach in a relevant contextual scenario.

Scientific foundation

Systematic reviews

immobilization using a sling or a splint

The Centre for Evidence-Based Practice (CEBaP) identified one retrospective cohort study comparing prehospital traction splinting to no splinting or delayed in-hospital traction splinting in patients diagnosed with an isolated open or closed femur fracture. The study found that prehospital traction splinting resulted in a statistically significant decrease in units of blood transfusion needed within the first 24 hours and a statistically significant shorter length of hospital stay, compared to no splinting or in-hospital splinting. However, a statistically significant decrease in mortality and complications could not be demonstrated, and the evidence was of very low certainty.

CEBaP was unable to find any evidence on the benefits of using a sling (compared to no sling or a splint) for the immobilization of a broken or dislocated arm.

Cooling with ice

CEBaP updated the evidence summary on cooling a sprain or strain in 2024 and identified one new randomized controlled trial comparing different durations of cooling with ice. One randomized study and one non-randomized trial were identified, comparing cooling with ice to not using ice, or cooling as an additional treatment to compression. The evidence is limited both for and against cooling with ice. Additionally, the three approaches did not demonstrate a statistically significant decrease in tissue swelling, pain, time to recovery or proportion of people showing recovery after two or 14 days. Evidence is of very low certainty, and results cannot be considered precise due to low sample sizes, a low number of events, wide confidence intervals and a lack of data.

When comparing different cooling durations, there is limited evidence from two randomized controlled trials in favour of cooling for 20 minutes. One study compared intermittent cooling (cooling for 10 minutes, then removing for 10 minutes, then cooling for an additional 10 minutes)

to cooling continuously for 20 minutes, but neither approach demonstrated a statistically significant decrease in pain and swelling, nor an increase in lower extremity function.

Cooling, compression, and elevation

Two randomized studies investigated the combined effect of cooling with compression and/or elevation, but when compared with no treatment, a statistically significant difference in swelling, injury severity, ability to bear weight, pain relief, time to recovery, range of movement, function and work absenteeism could not be demonstrated. Evidence is of low-certainty, and the results cannot be considered precise due to the low sample size and wide confidence intervals.

Elevation of the limb

CEBaP was unable to find any evidence on the benefits of using elevation of a limb in case of sprains or strains.

Realignment of an angulated fracture versus splinting in the position found

In 2015, the International Liaison Committee on Resuscitation (ILCOR) Consensus on Science looked at whether the realignment of an angulated bone fracture before splinting, compared to splinting the injury in the position found, would minimize injury of nerves and vessels, pain, time to medical transport, as well as the need for splinting (Singletary et al., 2015; Zideman et al., 2015). Studies were identified for a full review, but were excluded as they did not meet the inclusion criteria. Therefore, no evidence was found. No additional evidence was found for or against the realignment of angulated long bone fractures to minimize injury, pain or time to medical transport, either.

Compression dressings

A 2020 systematic review conducted by ILCOR found insufficient evidence to recommend either for or against the use of compression dressings for ankle strains (Borra et al., 2020). An evidence update in 2022 identified no new studies, so a formal update of the systematic review was not performed (Wyckoff et al., 2022b; Wyckoff et al., 2022c). For the critical outcome of pain reduction, low-certainty evidence from two randomized trials and three non-randomized trials was identified. None of the trials reported a reduction of pain with the use of a compression bandage compared with no compressive bandage, a non-compressive bandage or a splint or brace. For the critical outcome, reduction of swelling or edema, very low-certainty evidence (downgraded for risk of bias, indirectness and imprecision) was identified from three randomized controlled trials and one non-randomized trial. None of the studies showed that the use of a compression bandage reduced swelling. One randomized controlled trial found significantly less reduction of swelling with the use of an elastic bandage compared with no compression. However, this finding disappeared in a meta-analysis of all four studies.

For the important outcomes of the range of motion and recovery time, low- to very low-certainty evidence (downgraded for indirectness, imprecision or risk of bias) was identified from five randomized trials enrolling adults with ankle sprains. None of the trials demonstrated benefit from the use of a compression bandage compared with an ankle brace. Recovery time and range of motion were measured by the Karlsson score of function, percentage of uninjured

ankle range of motion, and time to return to work or normal walking, stair climbing and full weight-bearing.

For the important outcome of recovery time (measured by return to sports), very low-certainty evidence from one randomized trial enrolling 117 adults with ankle sprains was identified, showing benefit from the use of a compression bandage when compared with the use of non-compressive stockings.

Therefore, if the person with an ankle strain wants a compression dressing, this is acceptable as there is no evidence of harm caused by the dressing.

Evidence gaps

More research is needed on the optimal frequency, duration and initial timing of ice or cooling treatments after an acute injury, as sources are inconsistent in their recommendations.

Spinal injury

Key action

Help the person to keep as still as possible to prevent further damage to their spine.

Introduction

Spinal injuries can be caused by falling or diving from a height, being crushed by machinery or a heavy object, or being involved in road traffic collisions or sporting accidents. Spinal injuries can result in damage that can be permanent and may include disability, such as the loss of use of the arms or legs. Ensuring normal breathing and blood circulation of the person with a suspected spinal injury remains vital to their survival.

Guidelines

- First aid providers should not apply a cervical collar.*

Good practice points

- The person may have a suspected spinal injury if they have been involved in a traumatic incident, such as being the driver, passenger or pedestrian in a motor vehicle or bicycle collision, or they have fallen from a height greater than standing.
- A person experiencing the following signs or symptoms following a traumatic incident may have a spinal injury:
    - tingling sensation in the extremities or other parts of the body
    - pain or tenderness in the neck or back
    - an obvious deformity to the head, neck or spine
    - other painful injuries, especially at the head or neck
    - Loss of sensation or weakness in the torso or arms.
- First aid providers should always access emergency medical services (EMS) when suspecting a spinal injury.
- A person with a suspected spinal injury who is alert and awake should keep as still as possible and may not require manual stabilization.
- A person with a suspected spinal injury who is not sufficiently alert or awake may benefit from gentle support of the head (manual stabilization) to prevent inadvertent movement. First aid providers should not strap the person's head or neck.
- A person with a suspected spinal injury who is unresponsive but breathing normally should only be moved once EMS arrives or if they are in harm's way. The first aid provider should open the person's airway and monitor their breathing.
- In cases of suspected spinal injury, a head injury should also be considered.

Chain of survival behaviours

Prevent and prepare

- Promote and practise safe behaviours, such as wearing a seatbelt and using a headrest when travelling by car or wearing back protection when travelling by motorcycle or horse.
- Players should not play sports if they experience spinal pain.
- Junior sports coaches should consider when the introduction of tackling is appropriate and should endeavour to teach the correct technique (Harmon et al., 2019).
- Remove trip hazards from places of work and home, particularly where elderly people or people with a disability live, to reduce the chance of trips and falls.
- Always ensure ladders are stabilized before climbing them.
- Supervise children who are climbing on frames or furniture.
- Never dive into shallow water, or water with an obstructed view or high flow (e.g. rivers)
- Take particular care when diving into water in the dark.

Early recognition

- You may suspect a spinal injury if the injured person has:
    - fallen from a height greater than standing height
    - been involved in a road traffic collision
    - injured their head while diving headfirst into shallow water
    - been involved in a traumatic event (e.g. explosion or mechanical incident).

Older adults (over the age of 65) and people with an underlying bone condition may be more susceptible to spinal injuries following minor traumas such as a slip, trip or fall.

The person may also have:

- a tingling sensation in their arms or legs or other parts of the body
- pain or tenderness in their neck or back
- obvious deformity to their head, neck or spine
- other painful injuries, especially at the head or neck
- sensory deficit (e.g. numbness) or muscle weakness (e.g. paralysis) in the torso or upper extremities. This may be accompanied by loss of control of urine or stool.

However, some people with a spinal injury may not experience any symptoms.

Be alert as babies and young children may be unable to recognize they have a spinal injury. Likewise, someone with an altered mental status (under the influence of alcohol or substances) may be less likely to be able to recognize they have a spinal injury.

Pelvic fracture

First aid providers need specific training to recognize a pelvic fracture. Pelvic fracture may be associated with spinal injury.

A person with a pelvic fracture may:

- Experience pain at the hip, pelvis, groin or even the knee. This gets worse when moving.

- Not be able to support their legs. Sometimes, the foot (on the side of the fracture) is in an abnormal position.
- Experience sensory disturbances and tingling sensations in the legs.
- No longer be able to pass urine. Sometimes, there is a spontaneous loss of urine. In some cases, there is blood in the urine.
- Show signs of shock.

First aid steps

1. If the person is responsive and alert, reassure them and ask them to stay as still as possible. If the person is a child, has an altered level of consciousness or does not follow instructions, gently support their head to keep the neck and spine from moving.
2. Access EMS.
3. Ensure minimal handling or movement of the person at all times. Monitor their breathing and level of response for any changes.
4. Reduce shock symptoms by maintaining a normal body temperature.

- Do not move the person if you suspect a spinal injury.
- If the person must be moved (e.g. due to danger), it is best done with at least two first aid providers, with one keeping the person's head in line with their spine.

An unresponsive and breathing person with suspected spinal injury

If the person is unresponsive and breathing normally:

1. Leave the person as you have found them (e.g. on their back or side).
2. Maintain an open airway using the head tilt/chin lift or jaw thrust manoeuvre. The jaw thrust manoeuvre may cause less spinal motion.
3. Gently support their head in this position to prevent any movement.
4. Access EMS and follow their instructions.
5. Monitor their breathing and level of response for any changes.

Pelvic fracture

1. Help the person to lie down on their back and to keep still with their legs straight.
2. Place padding between their legs and then immobilize their legs by binding them together at their knees and feet.
3. Access EMS.
4. Monitor the person's breathing, circulation and level of response, particularly looking for any signs of shock.

If you suspect a pelvic fracture, do not "rock" or rotate the pelvis as this can restart or worsen bleeding.

Access help

Injuries to the spine may be difficult to confirm and difficult to manage in out-of-hospital settings. Help should be sought as soon as possible if an injury to the spine is suspected.

Education considerations

Context considerations

- Knowing the mechanism of the injury is crucial to identifying a potential spinal injury. Help learners practise identifying if incidents in relevant contexts may have involved an abnormal force to the body, resulting in a violent bending or twisting of the spine.
- Equipment for stabilization and transport may be context-specific. Consider the options for these with learners and use what is locally available (Pysny et al., 2017; Schimelpfenig et al., 2017).
- Rolling and lifting techniques should only be applied if absolutely necessary and when appropriate resources are available. More than one first aid provider is needed to apply these techniques safely so they should be discouraged when providers are acting alone (Schimelpfenig et al., 2017).

Learner considerations

- It is common for learners to be highly concerned about a spine injury in the event of a high-impact incident. Education providers should emphasize the importance of providing life-saving care by maintaining the person's airway and breathing and giving CPR when necessary.
- Consider how different learners may change the meaning of certain signs and symptoms, such as tingling, tenderness or deformation. Discuss terminology with learners to help them understand different signs and symptoms and be able to judge the seriousness of the injury using these terms.
- A pelvic fracture is very difficult to recognize; first aid providers should not be expected to recognize one. Consider whether learners need to learn this topic.

Facilitation tips

- This topic should be covered across each domain of the chain of survival behaviours, with emphasis added depending on the learner. For example, sports coaches might focus on prevention, whereas parents of young children might focus on recognition. All learners will need to practise stabilization techniques as part of the first aid action.
- Discuss the mechanism of the injury which will help learners understand when to suspect a spinal injury. Consider different scenarios (children playing on climbing frames, trampolining, road traffic collisions etc.) and discuss the types of force that could lead to a spinal injury.
- Emphasize that the use of cervical collars is not advised for first aid providers. Manual stabilization of the person with a suspected spinal injury is the most important action in order to limit unnecessary movement which might cause further damage.
- Practise or demonstrate manual stabilization techniques with learners, with the injured person in different positions (i.e. lying on their back, sitting etc.).
- Explain how manual stabilization aims to mirror a person's general anatomical standing position.
- Discuss the importance of conservative handling and minimizing movement. Use the "prevention of further injury" and "promotion of recovery" first aid principles.

Facilitation tools

- Create contextually relevant scenarios to reinforce learning (e.g. sport-focused role play examples for schools and sports club contexts, road traffic accidents using chairs and tables to represent cars for road users) (Kureckova et al., 2017). Videos of these scenarios can also be very effective.
- Practise asking questions and basic history taking to help with the identification of a spinal injury.
- Depending on the type of education, it may be appropriate to touch on basic sensory monitoring skills (i.e. fingers and feet) or basic assessment tools. See General approach.

Learning connections

- Make connections between spinal injuries and head injuries.
- Consider the change in airway management for a person with spinal injury who is unresponsive and breathing normally.

Scientific foundation

Spinal motion restriction

In 2025, the International Liaison Committee on Resuscitation (ILCOR) conducted a scoping review of the available evidence published in the last 25 years on spinal motion restriction, including the manual stabilization of a spinal injury (Djärv et al., 2025a; Djärv et al., 2025b). In this review, 66 studies were identified, of which the majority were experimental studies in healthy volunteers or human cadavers. The treatment recommendation formulated in 2015, against the use of cervical collars by first aid providers, remained the same (Singletary et al., 2015; Zideman et al., 2015).

Education review

Several papers were found that related to actions from healthcare professionals. Messaging for first aid providers focused on what to do in the case of a suspected spinal injury, and the findings were unanimous in recommending inline manual stabilization and access to further help (Fischer et al., 2018; Kornhall et al., 2017; Pek, 2017; Pysny et al., 2017). It is specifically recommended that first aid providers working alone should not attempt rolls or transport of the person with a spinal injury (Schimelpfenig et al., 2017).

Barss et al. (2008) explored the risk factors and prevention of a spinal cord injury from diving in swimming pools in Canada. The authors identified a limited awareness of the risks associated with diving into shallow or short swimming pools, which may result in life-altering injuries, and recommended the implementation of targeted educational interventions to address this gap.

Head injury and concussion

Key action

Remove the person from their activity and observe them for signs of a concussion or other brain injury.

Introduction

Head injuries are common across all age groups, but particularly in young children, sportspeople and older adults. They can range from being minor (requiring rest and pain relief) to severe (becoming unresponsive and requiring medical care). A concussion is a common type of head injury. It can be difficult to identify a concussion because there are many signs and symptoms which vary and are not always immediately apparent. In addition, some people do not recognize or admit to experiencing symptoms of a concussion. This can lead to a delay in proper treatment or accessing medical care.

Good practice points

- It is critical that a concussion is recognized and managed appropriately.
- Any person suspected of sustaining a head trauma (a forceful bump, blow or jolt to the head or body that results in the rapid movement of the head and brain), along with any of the signs of a concussion, must be presumed to have a severe head injury or concussion.
- When attempting to determine if a concussion has occurred first aid providers may consider utilizing a three-question screening process.
    1. Did a potential injury occur?
    2. Was the mechanism associated with a potential head injury?
    3. Was there any altered mental status?
- If the answer to all three questions is “yes,” these individuals should be removed from the activity and EMS should be activated, or the person should be referred to a qualified healthcare professional.
- Since concussion symptoms vary, first aid providers who are unsure if a concussion occurred may consider removing the individual from the activity until a qualified healthcare professional can evaluate them.
- Emergency medical care should be accessed immediately following a blow to the head if the person:
    a. becomes unresponsive, even for just a few seconds
    b. has an altered mental status (e.g. they become aggressive, have slurred speech, have a seizure; children may have an abnormal attitude or be very quiet and stop playing)
    c. has a motor or sensory deficit of one or more limbs (e.g. tingling in a limb, or balance or coordination problems)
    d. has a severe headache for more than two hours despite taking pain relief
    e. has impaired vision (e.g. sensitivity to light, blurred or double vision)
    f. has blood or a clear fluid coming out of their nose, ear or mouth
    g. vomits more than once

h. is unresponsive with abnormal breathing.

- If the person has a mild headache, a bump on their head or feels nauseous following a blow to the head, they may rest and continue to be observed for any change to their symptoms or behaviour requiring medical care.
- If the person shows none of these signs following a blow to the head, they may carry on with their day, but should be observed in case any of the above signs develop over the next 24 hours.
- In instances of head injury, a Spinal injury should also be considered.

Chain of survival behaviours

Prevent and prepare

- Promote and practise safe behaviours, such as wearing a seatbelt and using a headrest when travelling by car or wearing a helmet when travelling by motorcycle, bicycle or horse.
- Consider athletic body protection (i.e. helmets, face masks) when participating in contact sports. Sports coaches should be aware of the risks, and players should discontinue their involvement in sports if a head or spine injury is suspected.
- Junior sports should consider at what age the introduction of tackling is appropriate and should endeavour to teach correct techniques (Harmon et al., 2019).
- Remove trip hazards from places of work and home, particularly where there are small children, elderly people or people with disabilities to reduce the chance of trips and falls.
- Never dive into shallow water, or water with an obstructed view or high flow (e.g. rivers) and take particular care when diving in the dark.
- Learn how to recognize the signs of a concussion.

Early recognition

The person has a forceful bump, blow or jolt to the head or body that results in the rapid movement of the head and brain. This could include incidents such as a fall, a road traffic accident or an explosion.

Mild head injury:

- a bump on their head.
- a mild headache.
- feels nauseous.
- bleeding.

If the person has a mild headache or feels nauseous following a blow to the head, they may rest and continue to be observed for any change to their symptoms or behaviour requiring medical care.

Severe head injury (or concussion):

- becomes unresponsive, even for just a few seconds
- has an altered mental status (e.g. they become aggressive, have slurred speech, have a seizure; children may have an abnormal attitude or be very quiet and stop playing)

- has a motor or sensory deficit of one or more limbs (e.g. tingling in a limb, or balance or coordination problems)
- has a severe headache for more than two hours despite taking pain relief
- has impaired vision (e.g. sensitivity to light, blurred or double vision)
- has blood or a clear fluid coming out of their nose, ear or mouth.
- vomits more than once
- is unresponsive with abnormal breathing.

Other signs could also indicate a head injury and the signs may present differently in people. The main thing to look for is a change in the person. The signs of a severe head injury can happen immediately or can develop over several hours or days.

The possibility of a spinal injury should always be considered in the case of a forceful impact or fall.

First aid steps

1. Remove the person from their activity and ask them to rest.
2. Monitor the person for signs of a concussion and changes in their level of response and breathing.
3. If the head injury is severe:
    - Access emergency medical services (EMS).
    - Reassure the person and encourage them to keep their head and neck as still as possible. If the person is lying down, you may also use your hands or knees to keep their head as still as possible.
    - Monitor the person's level of response and breathing until EMS arrive.

Every bump or knock to the head does not cause a concussion or other severe head injury. If the person has had a blow to the head but the signs are not present or are mild, help them rest and then continue with their day, treating any minor injuries (e.g. bleeding from the cheek). However, they should be observed as a concussion can develop over several hours or days.

Access help

- Observe the person for signs of concussion and access help if any of the signs are present.

Recovery

- In many cases, rest from activity is the most effective initial treatment. However, injuries to the head are difficult to confirm and difficult to manage in out-of-hospital settings.
- Signs and symptoms of a head injury should have been resolved before returning to activities with associated risks (e.g. some work activities, driving or operating machinery or contact sports).
- Be aware that normal cognitive function may take time to be fully restored and that there may be residual learning and behavioural challenges in the short term (Harmon et al., 2019).

Education considerations

Context considerations

- Minor head injuries are a common occurrence and usually do not result in serious injury. Where learning first aid is within the context of a workplace or school or is for people who are involved with sport or driving, seek to understand the risks and risk behaviours that could lead to head injuries and frame education around them.

Learner considerations

- Consider how different learners or local translation during facilitation may change the meaning of certain recognition signs (such as headache, dizziness, nausea, vomiting, confusion, amnesia, tingling, mood change, behaviour change, fogginess, etc). Discuss terminology with learners to help them understand how to distinguish between a mild and severe head injury (Halter et al., 2019).

Facilitation tips

- Use scenarios to help learners understand the level of seriousness of the head injury. Note that in some cultures, medical care is sought for any head injury, but first aid providers can learn how to recognize a head injury, and many head injuries are minor and will not need professional attention (Halter et al., 2019; Kulnik et al., 2019).
- Consider differences in management and recognition, including how different people might have different levels of ability to respond to questions about how they are feeling, or what they can remember. For example, a small child or a person with dementia with or without a head injury might struggle to answer a question, so in such cases, observation of behaviour change by someone who knows the person will be particularly important.

Facilitation tools

- It might be helpful for learners to understand the signs of a concussion in these three groups:
    1. What the person feels: such as headache for more than two hours despite taking pain relief, nausea, drowsiness, dizziness, sensitivity to light or noise, double or blurry vision.
    2. Signs that can be recognized by someone who knows the person: such as a change in how they walk or talk, confusion, a change in their mood or behaviour (becoming anxious or aggressive).
    3. Signs that could be recognized by someone who does not know the person, such as becoming unresponsive, having a seizure or vomiting more than once.
- Use simple traffic light illustrations to help learners understand when a head injury might need immediate attention.
- Create contextually relevant scenarios to reinforce learning (e.g. sport-focused role play examples for schools and sports club contexts, road traffic collisions using chairs and tables to represent cars) (Kureckova et al., 2017). Videos of these scenarios can also be very effective.
- Practise asking questions and taking a basic history of the person to help with the identification of relevant signs and symptoms.

Learning connections

- In incidents that cause a head injury, a Spinal injury should also be considered.
- A person with a head injury may become unresponsive.
- A seizure may result from a blow to the head.
- A bruise may form on the head, to which an icepack could be applied.

Scientific foundation

Systematic reviews

In 2015, the International Liaison Committee on Resuscitation (ILCOR) reviewed the published evidence on the recognition of concussion by first aid providers (Singletary et al., 2015; Zideman et al., 2015). They identified very low-certainty evidence from one observational study with 19,708 people that compared the use of a simplified motor score and the Glasgow Coma Scale (GCS) score. There was no significant difference between the scores concerning the likelihood of differentiating between a minor head injury and a more serious concussion (brain injury), the need for advanced neurosurgical intervention and emergency tracheal intubation. A head injury without a concussion is a brain injury, but it can be challenging to differentiate between the two. No evidence was found with regard to the critical outcome of the difference in time to recognize a deteriorating person, as well as other important outcomes such as surviving 30 days with a good neurological outcome, or the likelihood of a poor neurological outcome.

ILCOR acknowledged the role that a simple scoring system could play. However, since these tools require a two-stage assessment (before concussion and post-concussion), this assessment is not recommended for first aid providers. An evidence update in 2022 explored the need for updating this systematic review, but no recent studies on a single-stage assessment system could be identified. However a good practice statement was added, stating that it is critically important that concussion is recognized and managed appropriately, and that in the absence of a validated, simple, single-stage concussion scoring system, the first aid assessment for a person with a possible concussion should be based on the typical signs and symptoms of concussion (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

An ILCOR scoping review specifically examining simple, single-stage concussion scoring systems in the first aid setting found no validated tools suitable for use by lay providers, reinforcing earlier conclusions that current scoring systems are insufficient for first aid application (Berry et al., 2025). This review supported the addition of a good practice statement emphasizing symptom-based assessment and appropriate referral in the absence of a reliable single-stage tool .

Non-systematic reviews

The Scientific Advisory Council of the American Red Cross (2015) stressed that first aid providers must recognize that no two minor traumatic brain injuries, also known as concussions, are identical in either cause or symptoms. First aid providers, therefore, may have difficulty recognizing them. The diagnosis of a minor traumatic brain injury should involve the assessment of a range of domains, including, but not limited to, the person's symptoms, behaviour, balance and coordination, sleeping patterns, cognition and analytical abilities and response to physical exertion. Each assessment tool should contribute additional information

regarding the status of the injured person by independently evaluating different aspects of cerebral functioning.

While many assessment tools are commonly used, individual variations in test scores and the necessity of a baseline assessment make it difficult for first aid providers to use these tools and interpret the results.

To help recognize a concussion, first aid providers should look for two signs. First, the person with a minor traumatic brain injury usually experiences a forceful bump, blow or jolt to the head or body that results in a rapid movement of the head and brain. Second, first aid providers should look for any change in the person's physical, cognitive, emotional or sleep patterns. Note that these symptoms may not appear immediately and that some people do not recognize or admit that they are having problems, particularly athletes in the middle of a match.

A concussion may be subtle and difficult to diagnose. Any person who has sustained trauma to the head, and experiences any of the symptoms identified here should be removed from activity and referred to a qualified healthcare professional experienced in evaluating and managing a concussion.

Education papers

Many of the clinical papers relating to head injuries focus on the effectiveness of diagnostic checklists which are designed for use by healthcare professionals. We did not find any checklists in the literature that would be suitable for first aid providers. However, one paper qualitatively explored the factors which affect the confidence and willingness of a first aid provider to act in a head injury situation. These included:

- Knowing the person with the head injury—this is relevant because changes in behaviour, attitude, speech or response level are indicators of a head injury.
- Being in a familiar setting with someone else nearby to consult.
- Witnessing the accident.

Authors concluded that education, which helped learners to think through scenarios to build their confidence to recognize whether a head injury was serious or not, rather than just calling for help, was important (Kulnik et al., 2019).

Acute lower back pain

Key action

Help the person take the recommended dose of painkiller or apply heat wrap therapy to relieve back pain.

Introduction

Lower back pain is common, and many adults experience it at some point in their lives. Common causes of back pain include injuries to the soft tissues in the back, such as muscles or ligaments. These injuries can result from lifting heavy objects or stress to the body from repetitive actions or positions. These guidelines focus on the management of acute lower back pain from low-risk injuries, such as the ones listed previously.

Guidelines

- When lifting heavy objects, people should bend their knees and keep their back straight to prevent lower back pain.*
- Paracetamol (also known as acetaminophen) may be effective at relieving some subsets of acute lower back pain.*
- Nonsteroidal anti-inflammatory drugs (NSAIDs, such as ibuprofen) may be effective at relieving acute lower back pain but may cause side effects, including gastric irritation, potential kidney interactions and high blood pressure.*
- Heat or cold application may provide short-term pain relief and reduce disability in those with a combination of acute and subacute (pain that continues between four to 12 weeks) low back pain.*

Good practice points

- The person should sit or lie down in a position most comfortable to them.

Chain of survival behaviours

Prevent and prepare

- Exercise regularly.
- If working at a desk, use an ergonomic chair.
- Learn how to reduce the risks of lower back pain.
- Lift items by bending the knees and keeping the back straight.
- Wear a combination of accessories to protect the back, such as back belts or shoe insoles.
- Change positions regularly and avoid holding a certain position or movement for too long.

Early recognition

The person was involved in a high-speed, direct impact incident, or may have been using their back for physical activity such as lifting or stretching. They may experience:

- sudden back pain
- back pain combined with neck pain or a tingling feeling running down the back of one leg
- sudden inability to walk due to lower back pain.

First aid steps

1. Comfort and reassure the person.
2. Determine the cause of the back pain. If it is the result of a fall or other traumatic incident, follow the first aid steps for Spinal injury.
3. Help the person move into a comfortable position and take the recommended dose of painkiller (such as paracetamol or ibuprofen).
4. Apply a heat source (e.g. heating pad) or cold source to the lower back.

Access help

- Access emergency medical care if the acute lower back pain is severe or the result of a traumatic incident (e.g. a fall or car accident).
- The person should seek medical advice if the back pain:
    - is related to an incident that occurred some time ago (e.g. car accident), or they have been experiencing it for four weeks or more
    - spreads to one leg, especially if the leg feels weak
    - is combined with weak legs, sensory disturbances, or the person experiences bladder or bowel problems, or issues with sexual functionality
    - is in combination with a fever.

The person should seek medical advice if they have a history of cancer, a weakened immune system, osteoporosis or have used steroids (e.g. prednisolone) for a long time.

Recovery

- If the back pain does not improve within four weeks, seek medical advice.

Education considerations

Context considerations

- Learners may have different beliefs about what lower back pain is and what causes it. Facilitate a discussion to better understand these beliefs.

Facilitation tips and tools

- Emphasize that lower back pain has many different causes (some are common and mild, while others can be serious). Helping the person get medical advice is an important first aid action so they can learn how to manage their pain.
- Use scenario-based learning (e.g. a road traffic collision) to practise recognizing and managing a spinal injury versus back pain.
- Facilitators can also make connections to lifting techniques used to reduce the risk of back pain:

    a. Hold the load firmly.
    b. Keep the load close to you.

c. Lift the load by pushing up with your legs.
d. Ensure your legs are stable before moving.

Learning connections

Connect this topic to head injury and spinal injury.

Scientific foundation

Systematic reviews

Two evidence summaries from the Centre for Evidence-Based Practice (CEBaP), which were updated in 2024, and three published systematic reviews were used for this topic.

Prevention

The CEBaP evidence summary looked at the prevention of lower back pain, comparing the results of using specific lifting techniques to lift a heavy weight, other lifting strategies or no technique at all. The evidence summary included three randomized controlled trials and three observational studies. It was shown that there is a statistically significant association between an increased risk of developing persistent low back pain or symptoms of a herniated lumbar disk and frequent lifting of any load mass with knees straight and the back bent forward. There were no new studies identified in the 2024 update.

There is also limited evidence supporting the benefits of lifting with knees bent and back straight. It was shown there is a statistically significant association between a reduced risk of developing symptoms of a herniated lumbar disk and lifting with knees bent and back straight. A statistically significant association between a decreased risk of developing chronic low back pain and occasionally and frequently lifting any load mass with an upright back could not be demonstrated. Statistically significant associations between back pain and lifting posture could not be demonstrated for non-chronic low back pain.

In addition, there is limited evidence showing no correlation between arm extension or twisting while lifting and the symptoms of a herniated lumbar disk. A statistically significant association between a decreased risk of developing symptoms of a herniated lumbar disk and arm extension or twisting while lifting could not be demonstrated.

Finally, the evidence is limited to support either the effectiveness of a single training session programme for low back health or not following the programme. A statistically significant decrease in back pain, using single training sessions that include lifting advice and advice for the prevention of back pain, compared to no training session, could not be demonstrated.

Evidence is of low to very low certainty and results cannot be considered precise due to the low number of events, limited sample size, lack of data and/or large variability of results.

One systematic review indicated that exercise, together with education, is likely to reduce the risk of lower back pain. Physical activity alone might reduce the risk of a lower back pain episode and subsequent sick leave, at least in the short term. The available evidence suggested that back belts, shoe insoles, ergonomic equipment or education alone do not prevent lower back pain. Additionally, due to the very low certainty of the evidence, it is unclear whether education,

training or ergonomic adjustments prevent sick leave caused by lower back pain (Steffens et al., 2016).

First aid

Two systematic reviews examined evidence on over-the-counter medications like paracetamol and ibuprofen.

One review looked at the evidence from 65 trials and suggested that NSAIDs effectively provide short-term relief in people with acute and chronic lower back pain without sciatica. However, the effect sizes are small. The evidence did not recommend a specific type of NSAID as being more effective than the others. In the randomized controlled trials, the selective COX-2 inhibitors showed fewer side effects compared to traditional NSAIDs. Still, recent studies have shown that COX-2 inhibitors are associated with increased cardiovascular risks in specific populations (Roelofs et al., 2008).

The second review shows that there is high-certainty evidence that paracetamol (4g per day) is no better at improving acute lower back pain in the short or long term, compared to a placebo. Additionally, paracetamol was no better than a placebo on other aspects, such as quality of life and sleep quality. On average, one in five people recounted side effects with no difference between the intervention and control groups. As most of the participants studied were middle-aged, it is unclear if the findings are the same for other age groups (Saragiotto et al., 2016).

An evidence summary from CEBaP searched for studies on heat or cold application in the case of back pain, and identified three new studies in 2024, resulting in 10 randomized controlled trials. Heat treatments included hot water bottles, bags with hot sand or hot salt, heat wraps or a heating blanket. Cold treatments included ice wraps. The studies demonstrated that heat application, whether in addition to education, exercises, analgesics or the use of naproxen cream or not, resulted in a statistically significant increase in pain relief and function. In addition, it was shown that cold combined with naproxen cream resulted in a statistically significant decrease in pain eight and 15 days after intervention compared to naproxen cream only.

Evidence is of low certainty and results cannot be considered precise due to limited sample size and/or large variability of results.

Non-systematic reviews

A review of clinical practice guidelines identified several effective, conservative (non-invasive) actions to manage acute and chronic lower back pain. Most high-quality guidelines recommend education, exercise, manual therapy and paracetamol, or NSAIDs as first-line treatments for lower back pain. However, the use of paracetamol has been challenged by recent evidence and this recommendation needs to be updated (Wong et al., 2016).

Another review identified clinical factors to recognize the conditions of acute lower back pain and sciatica. People with acute back pain experience improvements in the pain, varying levels of disability and usually return to work within one month. Further (but smaller) developments occur up to three months, after which the pain and disability levels remain almost constant. Low

levels of pain and disability last from three to at least 12 months. Most people will have at least one recurrence within those 12 months (Pengel et al., 2003).

Mammal bites

Key action

Clean the bite wound by rinsing it with clean water as quickly as possible to minimize the risk of infection.

Introduction

Bites and scratches from mammals, such as dogs, cats, monkeys, camels, bats and humans, are common and can cause infections. Most animal bites in adults and children are from dogs, and young children are most likely to be bitten by an animal they know. Adults are more likely to be bitten on the hand or wrist, while children more often receive bites on the face or neck (Elcock et al., 2022; Ortiz & Lezcano, 2023). There are 4.5 million people bitten by dogs every year, with 885,000 seeking medical care, and cat bites make up to 50%of animal-bite injuries across the world (World Health Organization, 2018). Bacteria can cause skin infections or complications to the whole body, such as sepsis or tetanus. Depending on the local context, first aid providers may also need to consider the risk of rabies.

Good practice points

- People should avoid approaching stray or wild animals and take extra care to keep from getting bitten.
- Bleeding from an animal bite should be treated as per the guidelines for severe bleeding.
- Depending on availability, the first aid provider should clean the wound with either potable (clean) water, saline or soap and water. Ideally, human and animal bite wounds should be cleaned with potable water and soap to minimize the risk of bacterial and rabies infections.
- The person should seek further medical care as soon as possible if vaccination is required or if the wound is open or deep.
- If available, a water source should be used to clean the bite area (e.g. from a tap, squirting device or water bottle).
- If warmth or pain develops around the bite area, this is an indication of infection and the person should seek medical care immediately. The bite area should be monitored as infection can happen in the hours or days after the bite occurs.

Chain of survival behaviours

Prevent and prepare

- Avoid approaching stray or wild animals.
- If there is a prevalence of rabies in the area, people should follow the advice of local health authorities.
- Be aware of specific diseases transmitted by animals in your area (rabies, anthrax, hantavirus, bovine encephalopathy, etc.).
- Always supervise babies and children around animals.

- Teach children how to behave safely around animals. If in a new environment, ask local people for advice on how to behave around the animals located there. Animals often bite as a reaction to human behaviour they perceive as threatening.

Early recognition

- The person tells you they were bitten by an animal or human.
- The person has visible teeth marks on their skin.
- Crush injuries or skin, muscle or soft tissue that has been ripped open may indicate dog bites, while deeper puncture wounds usually indicate cat bites.

First aid steps

1. If the wound is bleeding, apply pressure to the wound to stop the bleeding. Follow the steps for severe bleeding. Once the bleeding has stopped, follow the first aid steps for cuts and grazes.

Animal bites can transmit a number of diseases, such as Bartonellosis (transmitted by cats) or Herpes B (transmitted by monkeys).

Access help

- Seek further medical care as soon as possible if skin closure is required.
- If the injured person has not been vaccinated against tetanus, seek further medical care.
- If the bite came from a wild animal, rabies is common in the area and the injured person has not been vaccinated against it, seek further medical care.
- Monitor for signs of infection. If warmth or pain develops around the bite area, seek medical advice.

Recovery

- Change the dressing on the bite area as necessary.
- Seek psychological support if necessary.

Education considerations

Context considerations

- In areas where animal bites are common, include this topic to raise awareness. Learners should know the preventive actions, potential effects of and treatment for animal bites. Emphasize caution when in areas with stray or wild animals.
- When relevant, show the signs of a rabid dog and how to behave in the presence of one.
- Depending on the availability of resources, the first aid provider should clean the wound with either potable water, saline or soap and water.

Facilitation tips and tools

- Practise how to clean the wound as this may increase learners' confidence to do it themselves.
- Emphasize the importance of long-term wound care to prevent infection.
- Online or printed visuals of bite wounds, including ones that are and are not infected, may help learners to identify this type of wound in the future.

- Suggest local psychological support resources to help people affected by bite incidents involving aggressive animals or humans.
- Educational materials should reflect discussions with local public health authorities regarding the need for vaccinations.

Scientific foundation

Systematic review

The Centre for Evidence-Based Practice (CEBaP) performed four evidence summaries in 2019. One summary on dog bites was declared stable and the other three were updated in 2024, but no new studies were identified. No relevant studies on the use of wound irrigation for human or cat bites could be identified. For the use of wound irrigation for dog bites, one retrospective cohort study showed limited evidence in favour of wound irrigation. It demonstrated that irrigation of a dog bite with saline resulted in a significant decrease in wound infection, compared to no irrigation. Evidence is of very low certainty (downgraded for risk of bias and indirectness), and results cannot be considered precise due to the low number of events.

Non-systematic review

Potable (clean) water, saline and soap and water solutions are irrigants that benefit an animal bite. There are no direct comparisons between these different interventions. The literature reviewed in the section on cuts and grazes also supports irrigation as a method to prevent infection.

Despite multiple recommendations in literature reviews and common clinical practices, there is no evidence for the use of povidone-iodine to treat an animal bite.

Insect bites or stings

Key action

Remove the stinger or insect from the person to prevent the further spread of venom or disease.

Introduction

Insect bites and stings can transmit diseases (such as malaria, encephalitis or Lyme disease) and can cause wounds that can become infected. Certain insect bites and stings can also cause an allergic reaction in individuals who have been bitten or stung before.

Guidelines

- A bee's stinger should be removed as soon as possible.*
- A tick may be removed with tweezers or by using a commercial tick removal device, according to the manufacturer's instructions.*
- The following tick-removal methods must be avoided: using gasoline, petroleum or other solvents to suffocate the tick, using ice and burning the tick with a match.*

Good practice points

- If no commercial tick removal device is available, the first aid provider may grab a tick as close to the skin as possible with very fine forceps or tweezers and pull it gradually and firmly out of the skin.
- To remove a stinger from a person, the first aid provider may gently scrape the sting area with a flat object, such as a bank card or butter knife. Using tweezers or any other object that can pierce or press down on the venom bag should be avoided, as this may aggravate the symptoms.
- The bitten or stung area should be thoroughly cleaned with potable (clean) water and then an antiseptic solution. If no clean water is available, use an antiseptic solution.
- In the case of a bite or sting to the throat or mouth that starts to swell, the first aid provider should immediately access emergency medical services (EMS) and apply ice to the affected area to reduce the swelling.
- First aid providers should monitor the person for signs of an allergic reaction or anaphylaxis and provide the appropriate care.
- The person should avoid scratching the bite as this can cause an infection, especially if the fingernails are dirty.
- The skin may become redder, purple or darker, as well as warm and painful at the site of an insect bite or sting. This should improve over a day or two. However, if it gets worse, the person should seek medical advice, as this could be a sign of infection. Antibiotics or vaccinations may be needed.
- Travellers should check to see what insect-related risks are prevalent in the area to which they are travelling and seek medical advice. They may need vaccinations or medication before leaving home.

Chain of survival behaviours

Prevent and prepare

- To prevent diseases caused by insects, such as malaria and Lyme disease, use insect repellent and mosquito nets, and promptly remove any ticks.
- Avoid tick-infested areas and wear long clothing in a "downward cascade" configuration.
- Consult local authorities for information on landscaping and pest management to support any locally recommended behaviour or places to avoid to reduce risk.
- In some countries, per local regulations, report any tick bites to the authorities. Some authorities request that you send the biting tick or ticks for identification and testing.
- Consider using anti-malarial medication when travelling. Consult a medical professional for the recommended medication.

In first aid education, explore the following information with learners on avoiding bites and the behaviours to adopt during an insect attack:

- Keep away from flowering plants, ripe fruit bushes and trees, rotten fruit, compost and food waste. If this is not possible, wear long trousers and long-sleeved clothes and cover your hands and face.
- Wear shoes when walking outside, particularly on grass or flowering ground.
- When outside, cover your drinks and food and check them before drinking or eating.
- Wipe off any food from the clothes, hands and faces of children, as this may attract bees or wasps.
- Before moving objects with your hands (such as containers that have been left outside), check underneath and inside them for insects that may bite or sting.
- Shake out shoes, socks and clothing before putting them on to remove any insects.
- Do not touch or disturb bee or wasp hives. If you want to harvest honey, protect yourself by wearing long trousers and long-sleeved clothes and cover your hands and face as much as possible.
- Remain calm if attacked by a bee or wasp, as they react to movement. Do not wave your hands in an attempt to brush them away.
- Run and find shelter if attacked by a swarm.

Early recognition

A tick bite is not painful and is often not detected, or only discovered by accident. Initially, many ticks are only a pinhead in size, making it difficult to spot. An engorged tick is about the size of a small pea. After a few hours, the bite may start to itch.

A person who is bitten or stung by an insect may experience:

- initial sharp pain
- swelling, itching or a rash at the site of the bite or sting.

The person may develop a mild or severe allergic reaction following an insect bite or sting.

Observe the person closely for any development of an allergic reaction. A rash can be more difficult to see on black or brown skin (Nolen, 2020). Checking lighter areas of skin, such as the palms of hands or soles of feet, may help you to see it.

First aid steps

Tick bite

1. Reassure the person and remove the tick as quickly as you can. Use a manufactured tick removal device to remove the tick according to the manufacturer's instructions. If a manufactured device is not available, use tweezers to grab the tick as close to the skin as possible and pull it gradually and firmly out of the skin.
2. Wash the site of the bite with soap and water. See cuts and grazes.
3. Write down the date and the area where the person was bitten in order to monitor the area around the bite.
4. Seek medical advice if there is concern about an infection (fever, inexplicable fatigue or joint pain) or if a rash appears. The Lyme disease rash is a circular rash that appears as a patch surrounded by a ring. However, this "classic bull's-eye" rash does not always appear.

CAUTION

- Do not squeeze the body of the insect, as this may trigger the release of the disease-causing organisms onto the skin.
- Do not use chemicals or heat to numb or kill the tick.
- Note that insect bites are treated differently from snakebites.

Other insect bite or sting

1. Reassure the person and advise them not to scratch, as this may aggravate the injury.
2. If the stinger is still in the person, remove it as quickly as possible. Gently scrape the area with a flat object, such as a bank card or the blunt side of a knife.
3. Thoroughly clean the site of the bite or sting with water. If no clean water is available, use an antiseptic solution.
4. Cool the stung area with ice cubes in a bag of water or a cooling bag to limit swelling, itching and pain. If the sting is on the hand, remove the rings.

CAUTION

When removing the stinger, avoid using tweezers, your fingers or any other object that can pierce or press down on the venom bag, as this will make symptoms worse.

Access help

- Access EMS immediately if:
    - The person is bitten or stung in the mouth or on the throat. It can be dangerous as any swelling could block their airway. While waiting for medical care, try to cool the

injured area with ice (e.g. by letting the person suck on an ice cube) to reduce swelling.
    - The person shows any signs of a severe allergic reaction.
- Access medical care if:
    - The stinger will not come out.
    - The person develops a painful, itchy swelling or a rash.
    - The person feels progressively worse after being bitten or stung (this can occur up to 24 hours after the bite or sting).
    - The person was bitten or stung many times.
    - The person suspects he is not sufficiently protected from tetanus.

Recovery

- Monitor for signs of infection. The skin may become red, purple or darker, as well as warm and painful at the site of an insect bite or sting. This should improve over the course of a day or two. However, if it gets progressively worse, the person should seek medical advice, as this could be a sign of infection.

Education considerations

Context considerations

- Programme designers should consult local medical centres to find out which insect-related diseases are common in the area and what preventive measures to take. These measures may include:
    - using repellent or a bed net
    - taking medication for malaria prevention
    - getting vaccinated for tick-borne encephalitis
    - wearing long sleeves and trousers (especially at dawn when insects are active).
- In Europe and North America, several species of Ixodes ticks are carriers of tick-borne infections. One major infection is Lyme disease. Typical symptoms include fever, headache, fatigue and a specific skin rash that is circular and appears as a ringed patch on different parts of the body. However, the rash does not always appear. If left untreated, the infection can spread to the joints, heart and nervous system. Most cases of Lyme disease can be treated successfully with antibiotics. Encourage learners to familiarize themselves with their local environment and to consult a health professional if they need prophylactic antibiotics.
- In sub-Saharan Africa and South Asia, malaria is transmitted by the bite of a mosquito. A person with malaria is usually very sick with symptoms such as high temperature, shivering and shaking, and flu-like illness. Many effective medicines are available to prevent and treat malaria. Health professionals can advise you on how to take the medicine that is best for you.

Learner considerations

- In regions where Lyme disease is prevalent, all people are at equal risk of contracting it, though the visibility of skin rashes will vary according to skin colour (Fix et al., 2000). First

aid education should highlight where to find information on local tick-borne illnesses. Education should also discuss rash recognition across all skin colours and describe other symptoms that may be present, such as a yellowish, purple skin rash or a blush spot in persons with dark skin. Programme designers should actively look for opportunities to increase awareness of this topic in groups that are more likely to include learners who are dark skinned.

- However, not all rashes are a sign of Lyme disease. The redness on the skin could be caused by irritation from the tick bite, not a tick-borne infection.
- Tick-borne encephalitis virus (TBE virus) can be transmitted days to weeks after the bite. Symptoms typically appear shortly after a tick bite and include flu-like symptoms, such as fever, headache and gastrointestinal issues.
- While nearly half the world faces the risk of malaria, children under five years old are the most vulnerable group affected by it. Pregnant women, those with HIV or AIDS and mobile populations (travellers) are also particularly at risk (World Health Organization, 2020a).
- Learners who are aware of family members, friends or colleagues who are allergic to insect bites and stings should familiarize themselves with what support that person might need.

Facilitation tips

- Ask learners to share their experiences of being bitten or stung, including how it feels and how they responded, to help develop the group's confidence in handling this type of injury.
- Demonstrate how to use a manufactured tick removal device or tweezers to effectively remove a tick and a bank card or the blunt side of a knife to remove a sting.

Facilitation tools

- Share photos of local insects and their associated injuries or infections to help learners identify them.
- Bring a variety of tick removal tools to show learners.

Learning connections

- Ensure learners are comfortable monitoring a person for signs of an Allergic reaction and anaphylaxis.
- Link this topic to the removal of stingers of marine and freshwater animals.
- Give time to practise giving emotional support and comfort to the injured person as a bite or sting can be very distressing.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) conducted several evidence summaries on this topic, and the International Liaison Committee on Resuscitation (ILCOR) updated a CEBaP

systematic review (Huygelen et al., 2017) in 2021 (Charlton et al., 2021; Wyckoff et al., 2021; Wyckoff et al., 2022a).

Ticks

Forceps

There is limited evidence from an observational study in favour of pulling with tweezers compared to removal by hand. This study found a statistically significant decrease in ticks with damaged mouthparts or mouthparts that broke off when pulling with tweezers compared to manual removal. In a second study, a statistically significant decrease in ticks with damaged mouthparts or mouthparts that broke off when pulling with forceps compared to twisting with forceps could not be demonstrated. The evidence is of very low certainty and the results of these studies are imprecise due to limited sample size, the low number of events and large variability of results.

A randomized study with very low certainty evidence was identified that compared three different types of forceps (angled forceps, jewellers' forceps, economy forceps), and there was no difference in the number of ticks with damaged mouth parts upon removal by angled or jewellers' forceps compared to economy forceps. ILCOR suggests pulling with tweezers as a method to remove ticks (Wyckoff et al., 2021; Wyckoff et al., 2022a).

Commercial tick removal devices

Six studies, including three randomized controlled trials and three non-randomized controlled trials, compared commercial devices to pulling straight with tweezers, but results were mixed and were either in favour of tweezers, in favour of the commercial devices or showed no difference. Two randomized controlled trials compared different commercial devices to remove ticks and showed that a slit and rotation device and pen-tweezers (opposing jaws and rotation) resulted in less damage to the mouth parts than other devices (e.g. pulling with a card, twisting with a lasso, or a slit and traction device). The evidence is of low to very low certainty.

ILCOR suggests using commercial devices according to the manufacturer's instructions to remove ticks (Wyckoff et al., 2021; Wyckoff et al, 2022a).

Chemical treatments or heat, followed by mechanical removal

When comparing different methods for removing ticks, two observational animal studies compared chemical or heat treatments before mechanically removing ticks versus mechanical removal alone. The results showed that applying substances like gasoline, nail polish or alcohol did not make ticks detach from the animals.

ILCOR recommends against the use of chemicals or heat to remove ticks (Wyckoff et al., 2021; Wyckoff et al., 2022a).

Freezing

One observational study with low certainty evidence compared the freezing of a tick with a commercial freezing device against pulling straight with tweezers or pulling with commercial

devices. Removing the ticks was statistically significantly better with tweezers and the commercial devices than with the freezing device, which could not remove a single tick.

ILCOR recommends against the use of ice to remove ticks (Wyckoff et al., 2021; Wyckoff et al., 2022a).

Bee stings

With regards to bee stings, most people who get stung develop a raised, inflamed mark known as a weal. The CEBaP evidence summary revealed limited evidence from one randomized controlled trial in favour of quick removal of a bee sting. The trial showed a statistically significant decrease in the weal area after 10 minutes with a quick time of removal, compared to no quick removal. A second summary, including the same study, compared scraping with pinching to remove bee stings, but a statistically significant decrease in weal area using either method could not be demonstrated. The evidence is of low certainty and the results of this study are imprecise due to limited sample size and lack of data. The 2024 update of the evidence summaries did not identify any new studies.

Insect bites and stings, suction or household treatments

No studies were found about cooling with ice or using suction for an insect bite or sting.

Regarding household treatments (vinegar, baking soda, sugar, etc.), there is limited evidence from one non-randomized controlled trial, neither in favour of sugar nor a placebo bandage. A statistically significant increase or decrease of pain, swelling or itching using a sugar bandage compared to a placebo bandage could not be demonstrated. The evidence is of low certainty and results of this study are imprecise due to the limited sample size and lack of data.

Non-systematic reviews

Removing ticks as soon as possible reduces the infection risks of viruses they may carry, such as the virus that causes Lyme disease. Tick-borne encephalitis virus (TBE virus), however, is transmitted shortly after the bite. So, quickly removing the tick will not always prevent infection. TBE is an inflammation of the brain or meninges. Symptoms appear shortly after a tick bite with individuals presenting flu-like symptoms of fever, headache and gastrointestinal complaints (which are all uncommon in Lyme disease). Since its incidence in Europe is increasing due to the broadening of endemic areas and longer tick activity season, the health burden of TBE is increasing. There is no effective antiviral treatment for TBE, but the disease may be effectively prevented by vaccination (Eikeland et al., 2024; Taba et al., 2017).

Preventing tick bites to avoid complications includes avoiding tick-infested areas, applying diethyltoluamide (DEET) to the skin as directed on the product label, applying permethrin to clothing and wearing clothing in a "downward cascade" configuration. For example, wearing trousers that cover boot tops ensures that when ticks fall off, they do not lodge in boots (Benzoni & Cooper, 2025).

Education review

Commentary on medical education's bias to use white skin as the standard for the recognition of illness has identified a similar bias in first aid education, particularly regarding this topic. Nolen (2020) referred to a paper on the recognition of Lyme disease by Fix et al. (2000) that has informed our commentary for this section. The paper concluded that skin rashes caused by Lyme disease are under-recognized in African American populations (and by extension, people of colour). The article suggested a variety of reasons including:

- the rash is less visible
- less accessible care may make African Americans less likely to seek medical treatment
- healthcare professionals might be biased in their diagnosis, assuming African Americans are less likely to be infected with Lyme disease.

Aquatic animal injuries

Key action

Rinse the area with seawater to reduce pain and remove any stinging cells from the skin.

Introduction

Aquatic animals include those found in both salt and freshwater. Most are harmless; however, some jellyfish and venomous fish can produce stings that are painful and cause minor or severe allergic reactions. Stinging injuries are a common occurrence on many beaches worldwide and are problematic for people whose livelihoods depend on activities in which they can be stung. For bite injuries from a non-venomous aquatic animal, see cuts and grazes or severe bleeding.

Guidelines

- Rinse the area that was stung with seawater.**
- For non-life-threatening jellyfish envenomation, either rinsing with, showering or placing the area that was stung in heated water (40-45° C, 104-113° F) may relieve the pain.*

Good practice points

- First aid providers should protect themselves from being stung when removing any tentacles or stinging cells from the skin.
- First aiders should remove all stinging cells from a jellyfish from the skin. They may cover the stinging cells with sand or shaving foam and then scrape the cells off with cardboard or a bank card.
- To remove visible jellyfish tentacles, use tweezers.
- The first aid provider may place the injury in heated water (up to a maximum of 45°C/113°F) for at least 20 to 30 minutes or apply a heat pack.
- If a heat pack or hot water are not available, it is reasonable to apply a cold pack to relieve the pain.
- The choice of an agent applied to a jellyfish injury should be specific to the jellyfish.
    - Salt water may relieve pain from some jellyfish stings.
    - Vinegar may relieve pain for some jellyfish stings (e.g. box jellyfish).
- Avoid using aluminium sulphate, meat tenderizer or cold fresh water for pain relief.
- First aid providers should discourage the person from rubbing the site of the injury.
- In areas with deadly aquatic animals, when a person has been bitten or stung, medical care should be accessed immediately. This is also the case if the person experiences any signs of a severe allergic reaction. First aid providers should assess the person's airway, breathing and circulation while providing care for any other symptoms caused by the injury.
- There is a risk of tetanus from an aquatic animal injury, so tetanus vaccinations might be suitable as a preventive measure.
- The injury should be monitored as infection can happen in the hours or days after the bite occurs.

- If warmth or pain develop around the site of the injury after the initial first aid treatment, this is an indication of infection and the person should seek medical advice immediately. If injured by a sea urchin or sea star, the first aid provider should remove all foreign material. Clean the injury with soap and fresh water. Seek medical attention if a spine has punctured the person's joint.

Chain of survival behaviours

Prevent and prepare

- Injuries from venomous marine and freshwater animals can be related to livelihoods and economic activity in addition to tourism and leisure, so target preventive measures and education at local people at risk as well as visitors.
- For people at risk, protective clothing should be worn.
- Follow local guidelines about the risks of entering the water.
- Even if dead, a jellyfish can still sting due to the small capsules in the stinging cells of their tentacles (nemotocysts).
- Be aware when near stingrays. A stingray injury is caused by the venomous tail spines and depending on its size, usually stings people in the lower limb region.

Early recognition

The person has pain associated with puncture wounds from the stinging cells. You may be able to see stinging cells attached to the skin.

For a stingray injury, symptoms may include extreme pain, muscle cramps and a laceration at the site of the injury.

The person may develop a mild or severe allergic reaction following a sting. See Allergic reaction and anaphylaxis. Observe the person closely for any development of an allergic reaction. A rash can be more difficult to see on black or brown skin (Nolen, 2020). Checking lighter areas of skin, such as the palms of hands or soles of feet, may help you to see it.

First aid steps

1. Remove all the stinging cells from the person's skin. Protect yourself from being stung as you do this.
2. Rinse the area of the sting with seawater.
3. If possible, apply heat such as warm water, a heat pack or ash (up to a maximum of 45°C/113°F) to the site of the injury for 20-30 minutes. You could also immerse the injury in the water. The temperature of the water is hot enough to relieve pain, but should not burn the skin or cause pain to other uninjured areas of the skin.
4. Advise the person to seek medical care if there is a risk of tetanus or persistent pain that is not relieved by treatment.

Access help

- If the sting injury is from a deadly species of aquatic animal, or if there is any doubt, access emergency medical services (EMS) immediately.
- If the person experiences a severe allergic reaction, access help immediately.

Recovery

Monitor for signs of infection. The skin may become red, purple or darker, as well as warm and painful at the site of the sting. This should improve over the course of a day or two. However, if it gets progressively worse, the person should seek medical advice as this could be a sign of infection.

Education considerations

Context considerations

- Consult local aquatic institutions and water rescue associations to identify the most common and dangerous aquatic animals in the region. Include the first aid response for these species only in your programmes.
- Emphasize using seawater to rinse the injury and remove any remaining tentacles and stinging cells. Seawater should be available on site and requires no additional cost.
- If local authorities recommend applying medication to aquatic injuries (such as steroid ointments or lidocaine gels), ensure that this action is in line with the local legislation concerning first aid providers.
- In settings where groups at risk of aquatic animal injuries are defined by employment or livelihoods, provide targeted education programmes on this topic using facilitators from the affected population (de Aquino et al., 2016).
- Work with local aquatic institutions and authorities to ensure public notices are displayed to alert people to the dangers of being stung by an aquatic animal and the appropriate first aid.
- Aquatic animals tend to have localized names; be aware of what is in the area.

Learner considerations

- Adapt education to the literacy level of the learner group, being aware that illiteracy might be a factor for some at-risk groups (de Aquino et al., 2016).
- Visitors to areas where there is a risk of being stung might not be informed about the risks. Education in the form of public posters could be helpful. Where possible, these should include clear illustrations and an emergency number to call for help, to avoid language barriers.

Facilitation tips

- Emphasize preventive measures, such as identifying warning signs at the beach or wearing protective clothing and workwear when doing aquatic activities.
- If possible, facilitators should be familiar with the aquatic environment about which they are educating as this will allow them to add local knowledge about tides or dangerous

places to swim, as well as have local knowledge about how best to get help when necessary (de Aquino et al., 2016).
- When educating people in locations where incidences of injury are high, identify and share knowledge on any variations in times or locations where the risk from a particular species is greater (e.g. if injuries occur more frequently at certain times of day or night, or are more common in shallow or deep water).

Facilitation tools

- Share photos of venomous aquatic animals that are prevalent locally and provide basic information such as where they can be found.
- Share photos of wounds with stinging cells or sting fragments to help learners identify what these look like.
- Ensure learners know to use hot water at the optimum temperature range (up to a maximum of 45°C/113°F) and what this feels like. Encourage learners to reflect on how they would access hot water rapidly when in a typical aquatic environment, such as a beach or lake.
- Demonstrate the use of a bank card or similar flat object for stinging cell removal.

Learning connections

- Reference could be made to similarities with insect sting removal.
- Highlight the risks of burning the skin if the water temperature is too high.
- Some people with a sting may experience an allergic reaction or anaphylaxis.

Scientific foundation

The International Liaison Committee on Resuscitation (ILCOR) co-authored a Cochrane systematic review on interventions for treating jellyfish stings, which only included randomized controlled trials (McGee et al., 2023). Additionally, ILCOR conducted an additional systematic review that included non-randomized research (Djärv et al., 2025a; Djärv et al., 2025b). Finally, the Centre for Evidence-Based Practice (CEBaP) updated the evidence summary about the use of pressure immobilization for jellyfish stings.

The education review identified evidence concerning freshwater animal injuries; however, a scientific review of freshwater animal injuries has not been undertaken.

Systematic review

Jellyfish: Topical agents

The evidence from the Cochrane systematic review did not find a significant difference in outcomes between different topical treatments (i.e. application of seawater, freshwater, Sting-Aid®, Adolph's meat tenderizer, isopropyl alcohol, heated water, acetic acid, lidocaine or sodium bicarbonate). In the additional systematic review, five non-randomized studies were identified showing that topical lidocaine and seawater provided pain relief. However, using acetic acid, ethanol or isopropanol resulted in increased pain compared to using seawater. ILCOR has given a strong recommendation to rinse the area of a jellyfish sting with seawater

and a weak recommendation against the use of topical ammonia, isopropanol or ethanol (Djärv et al., 2025a; Djärv et al., 2025b).

Jellyfish: Hot water

The Cochrane systematic review included four (quasi-) randomized controlled trials that compared heat application (hot water, hot pack) to cold application for jellyfish stings. It was shown that heat application may reduce pain compared to cold application; however, findings depended on the jellyfish species. In the additional ILCOR systematic review, one additional non-randomized study was identified, showing the benefit of heat therapy compared to ice pack therapy. Based on the evidence, ILCOR suggests the use of heated water (40-45° C) (immersion, irrigation or shower) or hot pack application compared with application of cold packs, topical lidocaine, benzocaine, vinegar/5% acetic acid, papain, bromalin, aluminum sulfate or sodium bicarbonate to relieve pain from a jellyfish sting in the case of non-life threatening jellyfish envenomation (weak recommendation, very low certainty evidence) (Djärv et al., 2025a; Djärv et al., 2025b).

Jellyfish: Pressure immobilization

CEBaP could not identify any human studies about the use of pressure immobilization for jellyfish stings.

Non-systematic reviews

Jellyfish: Providing comfort

Usually, jellyfish stings receive no treatment other than being washed with water and having the stingers removed. This is because in most cases, itching caused by the sting does not last longer than a couple of hours and the person does not need further assistance. In this situation, the person affected does not need further aid. So, whatever first aiders use to treat the signs and symptoms of jellyfish stings, they will be providing comfort (D'aes et al., 2024).

Jellyfish: Hot water, seawater

ILCOR remarks that, while hot water appears to demonstrate a benefit compared with other treatments, access to hot water may not be feasible in many parts of the world. Hot water can also cause skin burns if the temperature is too high. In some locations, solar-heated water bags and instant hot packs are available at beach lifeguard stations for treating jellyfish stings. Seawater is generally available at the site of envenomation and requires no additional cost. While hot seawater is preferred for washing the area and removing any remaining tentacles or stinging cells (nematocysts), it is recognized that only hot fresh water may be available. However, fresh water may activate the stinging cells remaining on the skin; therefore, seawater should be used before applying fresh water when possible (Djärv et al., 2025a; Djärv et al., 2025b).

Jellyfish - Cold application

According to a narrative review by Niznik et al. (2024), the use of iced seawater or cold packs (as opposed to fresh water) may exhibit a strong analgesic effect by reducing the spread of venom, thereby functioning as a pain reliever (Niżnik et al., 2024).

Jellyfish - Vinegar

Vinegar can prevent remaining nematocysts on the skin from discharging. The use of vinegar as a method to prevent further nematocyst discharge has only been studied in in vitro studies or animal studies. It was shown that rinsing the jellyfish sting with vinegar (5%) for 30-60 seconds is effective in case of stings from the Australian box jellyfish (Prestwich & Jenner, 2007). However, the effects of vinegar after stings from Physalia species (Portuguese Man O' War, bluebottle jellyfish) are inconsistent and contradictory (Wilcox et al., 2017).

Other aquatic animals

Sea urchins and sea stars have sharp spines that easily penetrate the skin, wetsuits and shoes and are brittle enough to quickly break off once embedded. Thoroughly wash the area with soap and fresh water (tap water is acceptable). Remove any foreign material. Seek medical attention if spines have entered joints. Monitor for signs of infection (Niżnik et al., 2024).

After a sting incident by the Lesser Weever (Echiichthys vipera) or the Greater Weever (Trachinus draco), extreme pain occurs under the foot, lasting for 20-50 minutes. Hot-water immersion is considered the most effective treatment (Niżnik et al., 2024). Without treatment, the pain can persist for approximately 24 hours.

Education review

One study was identified that informs the education considerations for this topic. De Aquino et al. (2016) identified a high proportion (at least 30%) of the target group that experienced injuries from a specific type of venomous freshwater fish due to their livelihoods. Their injuries resulted in a high frequency of trauma and venomous toxins, leading to systemic complications. The study identified a high level of inappropriate treatment being applied. Combined, this had a direct impact on the ability of the injured people to work and emphasized the importance of education. The target group had a high degree of illiteracy and limited availability for extensive classroom-based learning. The study also highlighted the importance of facilitators who understand the local context (as opposed to facilitators from “outside”). The finding that secondary infections and complications related to a lack of knowledge of effective treatment demonstrate the importance of tailoring educational content to specific target groups. It also places equal emphasis on prevention and treatment during first aid education, a principle that can be applied more broadly to this topic.

Snakebites

Key action

Help the person keep as still as possible to slow the spread of the venom.

Introduction

Most snakes are harmless to humans, but some are venomous. A venomous snake injects venom through its fangs, and the bite can be life-threatening. Identifying the type of snake will help medical professionals determine whether the snake is venomous, the type of venom produced and the best way to help the person who has been bitten.

Guidelines

- Limb injuries can be kept still as much as possible to slow the spread of venom. For a bite to the arm, use a sling. For a bite to a lower limb, advise the person to limit any movement, including walking.*
- If they are properly trained to do so, first aid providers may use the pressure immobilization technique, by firmly applying a cotton or rubber pad under a non-elastic bandage for special situations such as remote locations and wilderness environments.*
- A tourniquet should not be applied to snake envenomation because it may not be effective and may result in an extended hospital stay.**

Good practice points

- The person should limit physical activity to prevent the spread of toxins. If the bite is on the person's leg, they should not walk on the immobilized leg unless no other option is available.
- It is reasonable to keep the injured area at or lower than the level of the heart.
- It is reasonable to remove jewellery, watches or tight clothing to prevent blood flow from being restricted if there is swelling.
- In areas with limited resources (e.g. a wilderness or remote environment with longer wait times to emergency medical care), it is reasonable to wash the wound.
- Suction should not be applied to a snakebite because it does not allow complete removal of the venom and it might aggravate the damage to the skin.
- A cold compress should not be applied to a snakebite because this may cause the blood vessels to contract and make the venom spread more quickly through the body.
- The wound should not be rubbed as this may cause the venom to spread more quickly through the body.
- Cutting the wound with a knife to increase bleeding is not recommended. It does not reduce the effect of the venom and aggravates the injury.

Chain of survival behaviours

Prevent and prepare

- Wear appropriate footwear in areas where snakes are present.
- Learn to identify local snakes and determine if they are venomous.
- Keep away from snakes that you encounter, trying not to disturb them. Do not kill or injure them.

Early recognition

A person with a snakebite may:

- be in pain
- have a visible bite mark
- experience swelling or discolouration of the skin around the area of the bite.

A venomous snake may also cause:

- thirst
- nausea and vomiting
- blurred or double vision
- sensory disturbances or paralysis
- sweating and excessive production of saliva
- a sudden drop in blood pressure, leading to Shock
- Seizures.

If possible and safe to do so, identify the type of snake that bit the person. Do not try to catch or kill the snake. Consider taking a photo or making a note of its features for a medical professional to identify. However, it is more important to provide care to the person than to figure out what kind of snake caused the bite.

First aid steps

1. Ensure the area is safe or move to a safer location.
2. Help the person lie down in a comfortable position. Advise them to move as little as possible.
3. Access emergency medical services (EMS).
4. Remove jewellery, watches or tight clothing to prevent blood flow being restricted if there is swelling. Do this while moving the limb as little as possible.
5. Mark the site of the wound to track any changes and note the timing of the bite.
6. Monitor the person's level of response and breathing. Encourage them to remain as still as possible and provide emotional support as a snakebite can be a traumatic experience.

- There are many resources available to learn more about poisonous snakes, including online databases and local resources (e.g. medical professionals, snake handlers, exterminators or poison centres).
- Be aware that snakes are traded and move around the world. You may encounter a snake that is not common to your area.

CAUTION

The following actions are not effective and may even cause further harm:

- applying a tourniquet
- sucking out the venom
- applying a cold compress
- rubbing the bite
- cutting the wound with a knife to increase bleeding.

Local adaptations

- If in an area with limited resources (e.g. a wilderness or remote environment with longer wait times to EMS):
    - wash the wound with potable (clean) water
    - immobilize the limb with a non-elastic bandage to reduce the spread of the venom and risk of infection. If this is unavailable, use clothing such as trousers or a shirt.
- If necessary, carry the person, for example, by making an improvised stretcher.
- Dispel any non-evidence-based local ideas about snakebites, particularly on the use of activated charcoal and black stone.

Access help

It is important to tell medical professionals about the type of snake that bit the person. This will help them provide the best care as quickly as possible.

Education considerations

Context considerations

- Contact the local biological centre to find out the types of snakes in the region, whether they are venomous, where to get antivenom, and any recommended treatment specific to the types of local snakes.

- Include education on first aid for snakebites in regions where venomous snakes are found or for learners travelling to areas with exotic or venomous snakes.

- Specially trained first aid providers may use the pressure immobilization technique in special situations such as remote locations and wilderness environments. Ensure adequate guidance and practice of this technique as there is evidence it is often applied with poor outcomes, even by those with specific training. Be clear that the technique should only be used in special circumstances.

Learner considerations

- For learners who might be visiting an area where there are snakes, emphasize the importance of researching which snakes are present, how to avoid them and what to do if bitten.

- For communities that live in places where there are snakes, prevention strategies tend to be well known, but first aid treatment seems less well known. Public campaigns to publicize snakebite first aid (immobilization of the bitten area and loosening restrictive clothing) could be effective (Alcoba et al., 2020).

Facilitation tips and tools

- Introduce this topic with a focus on prevention.
- Emphasize the importance of getting treatment quickly—even if the snake is not venomous, the bite can quickly become infected.
- Use pictures of the most common snakes in the region to increase learners' ability to identify snakes and raise awareness of the danger.
- Use pictures of the signs and symptoms to help learners understand the seriousness of snakebites.
- Emphasize that people should not try to catch or kill a snake.

Scientific foundation

This topic references five evidence summaries from the Centre for Evidence-based Practice (CEBaP) on the following topics: pressure immobilization, tourniquets, irrigation with water, cryotherapy and suction of a snakebite. CEBaP found no relevant studies on irrigating or washing a snakebite, nor on applying ice to a snakebite.

The International Liaison Committee on Resuscitation (ILCOR) completed an evidence update on pressure immobilization in 2021.

Systematic reviews

Pressure immobilization

Pressure immobilization is a technique that can be achieved in two ways: first, by using an elastic bandage to apply uniform pressure around and along the limb and second, by firmly applying a cotton or rubber pad under a non-elastic bandage, which sufficiently applies firm pressure specifically to the injured site. However, the CEBaP evidence summary indicated that the "feasibility of applying this technique" is challenging for first aiders. ILCOR performed an evidence update concerning pressure immobilization and decided that there was no need for a formal systematic review on this topic (Wyckoff et al., 2021; Wyckoff et al., 2022a). CEBaP also did not update its summary.

Elastic bandage and splint

There is limited evidence from two experimental studies, neither in favour of using an elastic bandage and splint nor of using the control (no first aid treatment). Neither study demonstrated a statistically significant decrease in the speed of venom spread, using an elastic bandage and splint compared to no first aid treatment. Evidence is of very low certainty, and the results of these studies are imprecise due to limited sample size and/or large variability of the results (CEBaP, 2019).

Elastic bandage and splint, combined with rest

There is limited evidence from one experimental study in favour of rest with an elastic bandage and splint. It was shown that using an elastic bandage and splint, in combination with rest, resulted in a statistically significant decrease in transit of mock venom, compared to the same treatment while walking. Evidence is of very low certainty and results cannot be considered precise due to limited sample size and/or large variability of results (CEBaP, 2019).

Firm cloth or rubber pad held in place by non-elastic bandage at a certain pressure

There is limited evidence from four experimental studies in favour of using a firm pad (e.g. a cotton cloth or a rubber pad), held in place with a broad non-elastic bandage under a minimum pressure of 60-70 mmHg. It was shown that using such a pad resulted in a statistically significant decrease in the speed of venom spread or transit of mock venom, compared to no treatment. Evidence is of very low certainty and results cannot be considered precise due to limited sample size and/or large variability of results (CEBaP, 2019).

Feasibility of applying pressure immobilization by lay first aid providers

There is limited evidence from two experimental studies in favour of training first aid providers to apply an elastic bandage. It was shown that training resulted in a statistically significant increase in bandage application with optimal pressure range, compared to written instructions. However, it was shown that first aid provider volunteers did not succeed in a statistically significant higher correct bandage application or achievement of correct pressure, compared to medical volunteers. Evidence is of low certainty and results cannot be considered precise due to limited sample size and large variability of results (CEBaP, 2019).

Tourniquet

There is limited evidence from 10 observational studies in favour of not using a tourniquet. It was shown that using a tourniquet increased local swelling, duration of hospital stay and severity of local envenomation, compared to not using a tourniquet. The studies could not demonstrate a statistically significant increase in haemorrhagic syndrome, acute renal failure, acute respiratory failure, death, death or disability, local edema, envenoming, duration of hospital stay, tissue necrosis, serum venom level before antivenom treatment and incidence of multiple organ dysfunction syndrome when using a tourniquet compared to not using a tourniquet.

There is conflicting evidence from three observational studies regarding the amount of antivenom required. One study showed that using a tourniquet resulted in a statistically significant decrease in the amount of antivenom required, compared to not using a tourniquet; however, the second study showed an increase in the amount required. Finally, the third study demonstrated no effect. Evidence is of very low certainty and results cannot be considered precise due to limited sample sizes, a low number of events and large variability of results (CEBaP, 2024).

Suction

There is limited evidence from one observational study, neither supporting nor opposing the use of suction. A statistically significant decrease in deaths or disability, the amount of antivenom required or duration of hospital stay, using suction compared to no first aid, could not be

demonstrated. Evidence is of very low certainty and the results of this study are imprecise due to the limited sample size, the low number of events and the large variability of results or lack of data (CEBaP, 2024).

Education review

We found one paper to provide educational insight on this topic. Alcoba et al. (2020) conducted a cross-sectional multi-cluster household survey in the Akonolinga health district of Cameroon and found an incidence of 665 snakebites per 100,000 inhabitants in one year. Despite good community knowledge of preventive measures, the researchers found that resulting fatalities, acute complications and chronic disability were associated with consulting traditional healers. Only 3% of people bitten by a snake received antivenom treatment. The authors concluded that there was an urgent need for first aid training for traditional healers and health professionals.

Poisoning

Key action

Quickly try to identify the poison, the amount and when (or how long) the person was exposed to it and access advanced care, such as emergency medical services (EMS) or a poison centre.

Introduction

Poisoning is when a person is exposed to a substance that can quickly damage their health or endanger their life. Most poisons are swallowed or inhaled; however, they can also be absorbed through the skin. Many poisonous substances are found in homes and workplaces, including some cleaning products, illicit substances, medications and even some plants.

Opioids act as poisons when taken in excessive amounts or by people for whom they are not prescribed, as they depress the central nervous system and can rapidly lead to respiratory failure and death. See unresponsive and abnormal breathing with suspected opioid overdose.

Guidelines

- For a person who has swallowed a poisonous substance, the first aid provider should consider laying them on their left side.*
- If the person ingested a chemical substance (one that could burn from the inside), the first aid provider can give them a dilutant if advised to do so by a healthcare provider, such as a poison centre.*

Good practice points

- The first aid provider should stop or limit further effects of the poison by stopping continued exposure. In the case of inhalation of toxic gas, the person should be removed from the area, but only if it is safe for the first aid provider to do so.
- In rooms that are potentially filled with unknown gases or vapours, exposure to all sources of ignition, such as naked flames, electrical equipment, oxidizing chemicals and the smoking of tobacco products, should be prevented.
- The nature and time of exposure and the name of the product or toxic substance should be described to the poison control centre, or local equivalent, or EMS. All bottles, packages or containers with labels or any other information about the poison should be given to EMS.
- If life-threatening conditions are present (e.g. unresponsiveness or breathing difficulties), the first aid provider should access EMS. The first aid provider should start CPR or provide other first aid as necessary, taking the necessary steps to avoid cross-contamination.
- If non-life-threatening conditions are present, the first aider should access and follow the instructions of the poison control centre (or local equivalent) or EMS.
- Rescue breaths should be avoided if poisoning by toxins such as cyanide, hydrogen sulphide, corrosives or organophosphates is suspected. The bag-valve-mask device may be used by those who are trained to do so.

- If the person is responsive, the first aid provider should remove any poisonous liquid remaining in the person's mouth by allowing the person to use water to rinse and spit out any remaining toxin.
- First aid providers should not give any diluents such as milk, water or activated charcoal to a person who has swallowed a poisonous substance unless they are instructed to do so by the poison control centre or equivalent poison expert.
- The person should NOT be encouraged to vomit as this may damage their throat.
- Button batteries contain poisonous chemicals which may leak into the body. If they are swallowed, this should be treated as poisoning.
- First aid providers with appropriate training may administer oxygen to people who have carbon monoxide or carbon dioxide poisoning.

Chain of survival behaviours

Prevent and prepare

- Ensure that all poisonous substances (such as cleaning products and medicines) are locked away and inaccessible to children. This includes brightly coloured or scented chemicals such as washing machine tablets, e-cigarette liquids or any drug-infused "treats" like THC gummies, also known as weed gummies or marijuana gummies.
- Carefully read the information leaflet that comes with any new medication to avoid an overdose.
- Regularly service cooking and heating appliances that use fossil fuels and install a carbon monoxide detector.
- Store chemicals out of access to any person who may accidentally or purposefully swallow or sniff them and ensure they have child-resistant lids.
- Hand sanitizers should be kept out of reach of children under the age of six at all times and used only with adult supervision.
- Depending on the type of work or hobbies, learn how to prevent direct contact with poisonous substances. This may include contacting the person who is responsible for workplace safety to teach specific safety regulations.

Early recognition

- Upon entering an environment where there may be poisonous substances, assess the area. There may be open packaging near the person (e.g. a packet of tablets) or spilled chemicals. A confined space may smell of gas (note that carbon monoxide is odourless, as well as colourless and tasteless). The person may also be able to tell you that they have had contact with a poisonous substance.

Poisoning signs and symptoms can include:

- burns around the mouth and lips
- breath that smells like chemicals, such as gasoline or paint thinner
- vomiting
- drowsiness
- difficulty breathing
- confusion or other altered mental status.

Poisoning signs and symptoms can mimic other conditions, such as Seizure, Stroke or an insulin reaction.

First aid steps

1. Help the person reduce or stop further exposure to the poison.
2. Try to identify the poisonous substance, the amount and when (or how long) the person was exposed to it. Only touch the packaging if it is safe to do so. If not, wait for EMS.
3. Access the poison control centre (or local equivalent) or EMS and report all of the information about the poison and situation. Follow their instructions.
4. Help the person into a comfortable position on their left side if possible, and monitor them for any change in their breathing or level of response.
5. Gather any bottles, packages or containers with labels and any other information about the poison to give to EMS.

Special cases

- If the person is unresponsive, open their airway and check for breathing. See Unresponsiveness topics.
- If the person has a chemical substance in their eye or around their mouth, see burns.
- If the person is having an opioid overdose, see Unresponsive and abnormal breathing with opioid overdose.
- If the person has been bitten by a snake or stung by a jellyfish, see snakebites or aquatic animal injuries.
- If the person vomits while lying on the ground, turn them on their side to prevent choking.

CAUTION

- If a toxic substance is suspected, the first aid provider may need to wear personal protective equipment such as a mask or gloves. If a harmful substance is suspected in or around the mouth, providers should use chest compression-only CPR to avoid contact.
- Do not make the person vomit as this may damage their throat.

Access help

- It is important to tell the poison control centre (or equivalent) or EMS as much as you can about the type of poison the person may have been exposed to. This allows the professionals to give the most appropriate help based on the person's needs.

Education considerations

Context considerations

- Establish with learners what substances and sources are most likely to lead to poisoning in their context and discuss ways to reduce the likelihood of poisoning. For example, discuss living or work conditions and how to store harmful substances.

- Give learners opportunities to assess danger through photos or scenarios, for example of a chemical spill or a gas-filled room. Discuss what signs they should look for. Explore how they can keep themselves safe. This may be particularly relevant to some workplaces.
- Inform learners of any local, regional or national carbon monoxide detector schemes such as free detectors from a local rescue service, regulated charity or commercial providers. These can be professionally fitted and tested.

Learner considerations

- Tailor education to specific learning needs. For example, child first aid courses aimed at parents and care providers may require more time around prevention.
- Decide if first aid education should include whether it is preferable to lay a person who has swallowed poison on their left side. If including this, reassure learners that if they forget which side to lay the person on, first aid principles remain, and the key is to move the person into a safe position that will maintain an open airway.
- Children younger than five years of age are the most likely to ingest a button battery. Most ingested batteries are from hearing aids, watches, games, toys and calculators (Ikenberry et al., 2011).
- In adults, the swallowing of chemical substances is frequently intentional, involves large amounts, and is life-threatening.

Facilitation tips and tools

- Use visual resources, such as danger labels and signs, as well as photographs of the impact of poisoning, to help learners identify what to look for.
- Help learners identify a poison control centre (or equivalent) and learn how to contact them.
- Use audio-visual resources to support facilitation and connect key first aid principles.
- Use information from official organizations when educating specific audiences and tailor the content accordingly. For example, the National Health Service in the United Kingdom provides clear guidance on what to do if you think a child may have swallowed a button battery.
- Suggest reading leaflets distributed by authorities on the specific poisoning risks in the region.

Learning connections

- Make connections to snakebites, aquatic animal injuries (e.g. jellyfish stings) and insect bites and stings.
- Connect to learning about a person who is unresponsive with abnormal breathing with suspected opioid overdose.
- The approaches of psychological first aid may be useful for this topic.

Scientific foundation

Systematic reviews

Body position

The Centre for Evidence-based Practice (CEBaP) systematic review (Borra et al., 2019) was updated in 2024, but no additional studies were identified. The review included nine randomized crossover studies in adult volunteers and showed that lying down on the left side resulted in a statistically significant decrease in the uptake of several drugs (acetaminophen, nifedipine, nitropyridine), compared to other body positions.

Dilution with milk or water

In 2022, the International Liaison Committee on Resuscitation (ILCOR) conducted an update of an evidence review completed in 2010 regarding the use of oral dilution if a caustic substance is ingested. The updated study identified one animal study that compared the use of kefir and distilled water with distilled water alone, examining the impact of an alkali injury to the oesophagus. No difference was found in histopathological outcomes at seven days following the injury. The ILCOR recommendation remains the same: a first aid provider may administer a dilutant if a caustic substance has been ingested, provided they are advised to do so by a health care provider. It is a weak recommendation as the evidence is very low-certainty (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

Induced vomiting – Ipecac

A CEBaP Cochrane systematic review identified five studies investigating the effectiveness of ipecac syrup as a first aid intervention (Avau et al., 2018). None of the evidence on the use of the syrup as a first aid intervention showed any benefit, and it may even cause harm.

One study provided evidence of low certainty on the use of ipecac versus no intervention in asymptomatic participants with toxic berry ingestion. This study took place in a prehospital setting and reported no clinical outcomes. While there may be little or no difference in emergency department referral, there may be an increase in adverse events.

Four studies examined adding ipecac syrup to single-dose activated charcoal with a cathartic (a medication that speeds stool passage). These studies either did not specify the type of overdose or included multiple types. Low-certainty evidence indicates that ipecac may make little or no difference in clinical improvement. Its effects on mortality, adverse events, clinical deterioration, hospitalization or intensive care unit admission remain unclear. This review has not been updated, and no recent systematic reviews are available on this topic.

Activated charcoal

A CEBaP Cochrane systematic review showed there is limited evidence for harm with single-dose activated charcoal ingestion after poisoning (Avau et al., 2018).

It was shown that single-dose activated charcoal and a hospital intervention (mostly gastric lavage) resulted in a statistically significant increase in several symptomatic features of poisoning (hospitalization rate, intensive care unit admission rate, need for intubation rate),

compared to hospital intervention alone. However, a statistically significant increase in mortality, convulsion rate, drug absorption (AUC, Cmax or Tmax), or the occurrence of adverse events (vomiting, absence of bowel sounds), using single-dose activated charcoal and a hospital intervention, compared to hospital treatment alone, could not be demonstrated. Furthermore, a statistically significant increase in mortality or the occurrence of adverse events, using single-dose activated charcoal compared to no intervention, could not be demonstrated. Evidence is of very low certainty and results cannot be considered precise due to limited sample size, the low number of events and/or large variability of results.

In addition, there is limited evidence either in favour of multiple doses of activated charcoal or no intervention. A statistically significant decrease in mortality, symptomatic features of poisoning (need for intubation, length of intubation, seizures, need for cardiac pacing or antitoxin treatment), drug absorption (AUC, Cmax or Tmax), or the occurrence of adverse events (absent bowel sounds), using multiple doses of activated charcoal and a hospital intervention compared to hospital treatment alone, could not be demonstrated. Evidence is of very low certainty and results cannot be considered precise due to limited sample size, the low number of events and/or large variability of results.

This review was not further updated. A more recent systematic review concluded that the majority of identified studies are case reports and that studies were unable to quantify the precise potential benefit of activated charcoal (Hoegberg et al., 2021).

Safe storage of poisons for poisoning prevention

CEBaP conducted an evidence summary in 2020 concerning the safe storage of chemicals and household poisons.

Evidence from six observational studies showed that chemicals and medicine, household poisons, kerosene and petroleum, and a lack of child-resistant lids on bathroom bottles are risk factors that resulted in a statistically increased risk of unintentional poisoning. However, the following risk factors could not demonstrate a statistically significant increased risk of unintentional poisoning: no child-resistant lids on household cleaning supplies, easy access to bathroom beauty supplies and medications, easy access to cleaning supplies and the use of unsafe product packaging. The evidence is of very low quality and results cannot be considered precise due to a lack of data and large variability of results.

There is evidence from one systematic review and one experimental study in favour of using child-resistant containers for paraffin and aspirin. It was shown that using child-resistant containers resulted in a statistically significant decrease in the incidence of paraffin ingestion and aspirin poisoning, compared to not using these types of containers. Evidence is of moderate quality.

As the evidence summary had been declared stable, the evidence was not updated further.

Use of CO detectors to prevent CO poisoning

CEBaP conducted an evidence review in 2020 about the use of CO detectors in the prevention of CO poisoning. Two observational studies demonstrated evidence that the absence of a carbon monoxide detector resulted in a statistically significant increased risk of poisoning or

hospitalization. The evidence is of very low certainty and results cannot be considered precise due to a low number of events. As the evidence summary had been declared stable, no further update was made.

Button battery ingestion and the use of honey or jam

CEBaP conducted an evidence review in 2025 about the use of honey or jam following button battery ingestion. Honey is thought to help minimize tissue damage by "coating" the battery (i.e. creating a protective layer between the oesophageal/gastric tissue and the battery), limiting voltage discharge and neutralizing the alkaline environment. However, no relevant studies were identified on eating honey or jam in people who swallowed a button battery. While a few studies on the topic have been published, the design of these studies (in vitro studies, animal studies, and a cohort study where only two participants received the honey intervention) did not comply with our selection criteria.

Non-systematic reviews

Use of CO detectors

Despite their utility, the effectiveness of carbon monoxide alarms or smoke alarms is limited by human awareness of the appropriate actions to take when an alarm sounds (Wheeler-Martin et al., 2015). Messaging around the importance and timing of battery replacement needs improvement. A properly installed and functioning carbon monoxide detector is an effective tool to protect household occupants from residential, non-fire-related carbon monoxide poisoning (McKenzie et al., 2017).

Danger of vomiting

Because caustic substances can cause as much damage when returning up the oesophagus as they did when swallowed, a person who has swallowed a caustic substance should not be made to vomit (Weigert & Black, 2005).

Dry cell battery poisoning

Children younger than five years of age are the most likely to ingest a button battery, and most ingested batteries are from hearing aids, watches, games, toys and calculators. The electrical current from a battery lodged in the oesophagus rapidly burns and damages surrounding tissue, leading to severe and potentially fatal complications (Ikenberry et al., 2011). Although hearing aid batteries are not the riskiest of ingested batteries (<1%), larger button cells, such as the popular lithium coin cells, can cause life-threatening damage in just two hours. If the battery is in the oesophagus, it will have to be removed. Burns to the oesophagus may lead to perforations, massive bleeding and complications from scarring, as well as months to years of impaired feeding (ÇEVİK & Boleken, 2013; Martin, 2009). If the battery has passed into the stomach, it is usually safe to allow it to pass through the intestinal tract.

Fatal complications after button battery ingestion are increasing worldwide. As soon as they suspect a button cell has been ingested, people should contact their general practitioner or another professional caregiver for medical guidance, regardless of the battery's diameter. An X-ray should be made for every child after battery ingestion. If they are showing signs of being seriously ill, such as vomiting or active bleeding, the emergency services should be called. A

battery lodged in the oesophagus of a child may go undetected if parents or caretakers are unaware of it, as the symptoms can appear the same as other conditions such as viral infections (Krom et al., 2018).

Carbon dioxide

Large amounts of carbon dioxide are produced during the fermentation process in wine cellars, silos or cesspools, especially if they are not properly ventilated. It is heavier than air and floods the cellar or confined spaces and can dilute the oxygen concentration in air below the level necessary to support life. In the United States, carbon dioxide is responsible for more than 2,700 deaths annually (Wheeler-Martin et al., 2015).

Low concentrations of carbon dioxide can cause increased respiration and headache. In high concentrations, people may die due to the lack of oxygen in the carbon dioxide-filled atmosphere. Symptoms may include loss of mobility or consciousness, dizziness, drowsiness and nausea. Additionally, skin contact with frozen carbon dioxide (dry ice) may cause frostbite (IFRC, 2016).

Carbon monoxide

Carbon monoxide is a non-irritating, colourless and odourless gas and may be difficult to detect. It is a flammable gas and may react violently with other substances and sources of energy, potentially causing explosions. Frequent sources of carbon monoxide are gas combustion engines, fires, furnaces and space heaters, especially in poorly ventilated spaces. Carbon monoxide binds to red blood cells more strongly than oxygen can, thus reducing the amount of oxygen that can be carried by the blood to reach important organs such as the heart and brain. Typical symptoms of carbon monoxide poisoning are headache, nausea, vomiting, muscle weakness (especially in lower limbs), unconsciousness and seizures. Unlike other conditions that decrease oxygen in the blood, the person poisoned by carbon monoxide is rarely paler or showing bluish skin colouring around their fingers, lips or nails (cyanotic) (IFRC, 2016).

Poisoning by cannabis edibles

Children are at risk of accidental ingestion and overconsumption of cannabis because many edibles resemble candy (like THC gummies) or other food and drink. Cannabis edibles present specific risks of overconsumption and accidental ingestion, especially among cannabis-naive individuals and children, and additional risks for youth and senior populations with regard to mental well-being and cognitive functioning (Grewal & Loh, 2020).

Poisoning by hand sanitizer gels

Many hand sanitizers come in brightly colored bottles, can be laced with glitter and smell like food or candy. This type of packaging makes them very tempting to young children. While a child who licks a tiny amount of hand sanitizer off their hands is unlikely to become sick, a child ingesting any more than a taste of hand sanitizer could be at risk for alcohol poisoning (America's Poison Centers, n.d.).

Nosebleeds

Key action

Encourage the person to sit with their head leaned forward slightly and pinch their nostrils for 10-15 minutes.

Introduction

A nosebleed (epistaxis) is one of the most common ear, nose and throat emergencies encountered in both primary care and emergency settings. A nosebleed is bleeding from the nostrils or nasal cavity that may occur spontaneously or as a result of trauma and can sometimes be severe. The person experiencing the nosebleed is usually able to treat it themselves. They are most common in people between the ages of 10 and 60.

Good practice points

- Applying pressure to the lower third soft portion of the nose is the only first aid intervention needed in most cases.
- Reassure the person. Nosebleeds can be alarming, especially for young children.
- A person experiencing a nosebleed should sit with their head slightly forward with their nostrils pinched for 10 to 15 minutes (maximum). If the bleeding does not stop after 15 minutes of continuous manual pressure or the person becomes lightheaded from loss of blood, they should seek medical attention.
- A person with a nosebleed due to trauma should seek medical attention if they experience signs of brain injury, obvious nasal deformity or signs of a facial fracture.
- A person experiencing a nosebleed that does not stop and is taking anticoagulant or antiplatelet medication, or who has a blood clot disorder, should seek help from a healthcare professional or activate EMS.
- The use of cryotherapy as a first aid intervention for sudden, severe nosebleeds is not recommended.
- The person should lean forward, breathe through their mouth and spit out any blood. Leaning forward may decrease blood flow to the airway and stomach, which can cause breathing difficulties and vomiting, respectively.
- A severe nosebleed may be linked to a traumatic brain injury and facial bone fractures. Signs of traumatic brain injury, including altered mental status, loss of consciousness, repeated vomiting, changes in vision, difficulty moving or walking or severe headache, indicate the potential of a medical emergency and the person or first aider should access emergency medical services (EMS).

Chain of survival behaviours

Prevent and prepare

- Prevent trauma to the nose by using guards or facemasks during recreational activities.
- Avoid picking or forceful blowing.

- Be aware that a nosebleed may occur spontaneously due to climate (temperature or humidity) or may be caused by chronic issues like allergies or a reaction to medications.
- Ongoing nosebleeds can lead to anaemia and shock due to blood loss.

Early recognition

- The person has blood coming out of their nose.

First aid steps

1. Advise the person to sit and lean their head forward slightly while pinching their nostrils for 10 to 15 minutes (maximum).
2. If the nosebleed continues after 15 minutes of continuous pressure or the person becomes lightheaded from blood loss, seek medical attention.
3. If the nosebleed was due to trauma and there are signs of a brain injury, obvious nasal deformity, facial fracture or the person is taking anticoagulants, access EMS immediately.

Access help

Contact a general practitioner or out-of-hours medical service immediately if:

- The nosebleed does not stop after pressing the nose twice for 10 to 15 minutes each time.
- The person is taking a medicine (e.g. anticoagulants, such as Warfarin or aspirin) that helps prevent blood clots or the person has a condition that means the blood cannot clot properly (haemophilia).

Schedule an appointment with a general practitioner if:

- The person experiences frequent nosebleeds within a short period of time, for example, several times within a month.
- If a child under two years old has had a nosebleed.

Education considerations

Facilitation tips and tools

- Demonstrate the proper positioning of a person with a nosebleed: the head tilted down slightly in a “sniffing” position.
- Educating people, like caregivers, on proper positioning, duration and where to apply manual pressure, is an opportunity to improve the outcomes for a nosebleed (Tunkel et al., 2020).

Learning connections

- A traumatic nosebleed is a form of craniofacial trauma and may be linked to a traumatic brain injury and facial bone fractures. See head injury and fractures, sprains and strains.

Scientific foundation

Systematic review

Cryotherapy

The International Liaison Committee on Resuscitation (ILCOR) conducted a scoping review on cryotherapy for nosebleeds in 2021 (Berry et al., 2021; Wyckoff et al., 2021; Wyckoff et al., 2022a). No studies with people with nosebleeds were identified, but six studies examined the effect of ice application on different nasal outcomes in healthy volunteers. One randomized crossover study with 16 adults showed a significant decrease in nasal mucosal blood flow with ice packs inside the mouth compared with an ice pack applied to the forehead. In a second randomized crossover study, sucking ice cubes compared with the application of ice packs to the forehead resulted in a lower nasal submucosa in 13 adults. The combination of sucking ice cubes and an ice pack to the forehead resulted in a larger decrease of nasal submucosal temperature than an ice pack alone. Three observational studies could not show a difference in nasal mucosal blood flow, inspiratory airflow, nasal blood volume or mean nasal cavity volume following the application of ice packs around the neck (for five or ten minutes) or of cold compresses to the nasal dorsal skin. In a fourth observational study with ten healthy adults, ice-water immersion of the feet compared with hand and forearm immersion resulted in a greater nasal airway volume. ILCOR concluded that the current evidence does not support recommendations for the use of cryotherapy as a first aid intervention for acute epistaxis.

Posture

A Centre for Evidence-Based Practice (CEBaP) evidence summary updated in 2024 could not identify any evidence about the ideal posture regarding nosebleeds.

Non-systematic reviews

Nosebleeds are extremely common in childhood, with as many as three in four children experiencing at least one episode. The management of nosebleeds in children can be more challenging due to the distress caused by the condition, difficulty examining a child who is uncooperative and the required treatment (Benaran et al., 2024)

Bequignon et al. (2017) and Tunkel et al. (2020) recommend sitting upright with the head tilted forward slightly, based on consensus. The rationale is that, in this position, blood flows forward through the nose. Tilting the head backward causes blood to flow into the throat, which can lead to nausea, vomiting and diarrhoea.

Pinching the nose is the simplest way to stop a nosebleed. However, it remains unclear how long the nose should be pinched. There are no studies on the optimal duration of compression for effective control of a nosebleed, but 15 minutes of sustained compression was the duration used in the only identified clinical trial comparing nasal compression with either fingers or a nose clip. Educating patients and caregivers on proper positioning, duration and compression location is an opportunity for quality improvement (Tunkel et al., 2020).

MEDICAL CONDITIONS

Chest pain (cardiac)

Key action

Recognize the symptoms that may indicate a heart attack and access emergency medical services (EMS) immediately.

Introduction

Chest pain can indicate a range of conditions related to the heart, lungs or rib cage. For first aid providers, the most critical risk is a heart attack. A heart attack is usually caused by a blockage in one of the blood vessels supplying the heart muscle, resulting in damage to the heart. Prompt recognition and management of a heart attack can save lives. Delayed treatment increases the probability of complications such as sudden death or later heart failure. Other common causes of chest pain include trauma, angina and indigestion.

Guidelines

- While waiting for EMS to arrive, consider having the person suspected of having a heart attack take an oral dose of acetylsalicylic acid. Acetylsalicylic acid should be avoided if the person is allergic to it or if the person takes acetylsalicylic acid regularly and has just taken the recommended dose.*
- If the first aid provider is trained and oxygen is available, the provider may give oxygen to a person experiencing chest pain if they recognize the person is hypoxic, after calling for advanced care and providing acetylsalicylic acid (ASA, Aspirin).*

Good practice points

- If a heart attack is suspected, EMS should be accessed immediately, especially if the pain is intense, the person has shortness of breath, the person's skin is pale or ashen and clammy, they have a bluish colour to the skin on their lips, ears, fingers or toes, or they feel a pulsing pain in their jaws and teeth. Access EMS even if the pain has only lasted a couple of minutes.
- The first aid provider should help the person get into a comfortable position; the person should refrain from physical activity.
- If the person has medication, is diagnosed with angina and is experiencing acute chest pain, the first aid provider should assist them in taking their medication.
- While waiting for EMS to arrive, consider having the person suspected of having a heart attack take an oral dose of 150–500 mg acetylsalicylic acid.
- If available, get an automated external defibrillator and keep it close to the person in case it is needed.

Chain of survival behaviours

Prevent and prepare

- There are national and global organizations that research how to reduce the likelihood of heart conditions. Refer to your country's health authority for more information.
- Exercise and a healthy diet, combined with low or no alcohol consumption and not smoking, can help reduce the chances of a heart attack.
- If you have family, friends or colleagues who have angina or heart disease, be aware of where they keep their medication in case of an emergency.
- Keep acetylsalicylic acid on hand if you are diagnosed with heart disease.

Early recognition

Ask the person about their chest pain. If they have been diagnosed with angina or another heart condition, they should be able to tell you this. If the chest pain continues even after taking medication, it is important to quickly recognize the possibility of a heart attack and access EMS.

Signs and symptoms that may indicate someone is having a heart attack include:

- chest pain
- chest pain in combination with pain in the arm or shoulder
- chest pain in combination with sweating
- chest pain in combination with palpitations.

Pain may be described as discomfort, vice-like pressure, cramping, squeezing or burning. A heart attack can start with non-specific complaints, especially in females:

- nausea
- shortness of breath
- pain radiating to the jaw
- pain in the upper abdomen
- pain between the shoulder blades
- pain that lasts more than a few minutes or it may come and go.

People may also experience the following signs and symptoms.

- paleness
- anxiousness
- bluish colour to the skin on their lips, ears or fingers.

- Heart attacks can occur in people who have not yet been diagnosed with heart disease.
- Heart attack symptoms may include any of the ones listed above and EMS should be accessed immediately.
- Symptoms may be more subtle or uncommon in some populations, such as people who are female, elderly or have diabetes.
- For angina, the pain is often familiar and improves when the person rests. For a heart attack, the pain is often more persistent.

First aid steps

1. Help the person to sit down in a comfortable position and take their medication.
2. Access EMS immediately if you suspect a heart attack. Ask a bystander to bring a defibrillator if available.
3. Suggest the person consider chewing a dose of 150-500mg of acetylsalicylic acid if a heart attack is suspected.
4. Reassure the person and monitor their breathing and responsiveness.

- If the person becomes unresponsive with abnormal breathing, start CPR.
- Do not give acetylsalicylic acid to the person if they are allergic to it, have a bleeding disorder or have already taken the recommended dose.

Access help

- Ask bystanders to help you access EMS, monitor the person and get medication or a defibrillator.
- Emphasize that you suspect it is a heart attack when you access EMS, so they can appropriately prioritize your case. Update EMS if the person's condition changes (e.g. they collapse and stop breathing).
- It is important to access help quickly to minimize any damage to the heart.
- If the person has been diagnosed with angina and has their medication, it may not be necessary to access EMS. However, you should access EMS if the pain does not subside, as it usually does within a few minutes of taking medication.
- If the person has taken medication for indigestion but the pain does not subside, access EMS. Note that a heart attack is often mistaken for indigestion.

Recovery

- If angina pain patterns have changed, a change in medication or treatment may be needed. Suggest that the person seek medical care.

Education considerations

Context considerations

- In places with ambulances, EMS can provide treatment during transport to the hospital, which can improve the person's outcomes (Cartledge et al., 2017).
- Be aware of the recommended medications available in your country, for example, glyceryl trinitrate [also known as nitroglycerin] for angina or acetylsalicylic acid for a heart attack. Additionally, be aware of the laws surrounding whether a first aid provider can assist with or administer medication.
- In contexts where vasodilators (e.g. nitrates) are used, be aware that they might have side effects, including low blood pressure or unresponsiveness.
- Consider focusing on the prevention aspect of the chain of survival behaviours in all contexts, particularly where there is limited or no access to EMS. Awareness of how diet

(including alcohol consumption), lack of physical activity and smoking contribute to increased risk should be included as part of first aid education on this topic.

Learner considerations

- Consider which part of the chain of survival behaviours learners might focus on in this topic according to their circumstances. For example, for younger learners, it might be most appropriate to focus on prevention, while caregivers could focus on recognition.

- When working with a diverse group of learners, be sure to emphasize that symptoms may be less noticeable in females, older adults and people with diabetes.
- When developing first aid programmes, research which different at-risk communities might be best targeted with education. For example, particular ethnic groups or more socially disadvantaged groups might be at higher risk of heart attack and other cardiovascular diseases due to health inequalities and lack of access to health services (Mendis et al., 2011).

Facilitation tips

- Emphasize the need to recognize a heart attack and get help quickly.
- Raise awareness of risks associated with concealing pain at the early stages of a suspected heart problem by exploring the potentially serious causes and outcomes of chest pain.
- Explore how people may describe or feel different types of chest pain.
- Clarify any unfamiliar terminology. If necessary, resolve any confusion by differentiating between a heart attack and cardiac arrest.
- Identify the causes of chest pain but emphasize that the aim is not to diagnose the cause. It can be very difficult to tell what type of chest pain a person is experiencing, even for medical professionals. If the first aid provider is unsure, they should access EMS immediately.
- Ask learners to share their experiences with heart attacks and to describe what they did or would have done differently. This can be especially useful for exploring key messages, such as recognizing a heart attack and not delaying access to EMS.
- Emphasize that sitting in a comfortable position eases the strain on the heart, and if the person collapses, they are less likely to injure themselves.
- Explain that the reason acetylsalicylic acid can be beneficial is that it makes the clot-forming part of blood less sticky and may improve blood flow past the blockage in the blood vessel.
- Include information about the possible contraindication for giving acetylsalicylic acid in some people (allergy or bleeding disorder).

Facilitation tools

- Use case studies relevant to learners' contexts. The discussions from these studies can be adapted to create practice scenarios.
- Casualty simulation provides an opportunity for learners to practise communicating with someone who is in pain, ensuring the person is in a comfortable position, accessing EMS

and being prepared to provide care should the person become unresponsive or stop breathing.
- The following materials may be helpful introductions to the topic:
    - Signs and symptoms
    - Heart attack video

Learning connections

- A heart attack may cause a person to stop breathing. Make the connections between this topic and how to help someone unresponsive with abnormal breathing, including how and when to use a defibrillator.
- A heart attack can be a very frightening experience. Help learners make connections to any psychosocial support skills they can use to provide comfort.
- Encourage learners to think critically about how to position a person depending on their injury or illness. See general approach.

Scientific foundation

Systematic reviews

In 2019, the Centre for Evidence-Based Practice (CEBaP) completed a review on the following topics: clinical signs and symptoms of chest myocardial infarction (heart attack) and body positions for someone having a heart attack. The reviews were updated in 2024. In addition, we used a Cochrane systematic review on oxygen therapy for acute myocardial infarction and an International Committee on Resuscitation (ILCOR) systematic review about the use of acetylsalicylic acid.

Signs and symptoms

There is limited evidence from four systematic reviews of diagnostic accuracy studies showing that positional pain, pleuritic pain or sharp pain could be clinically helpful for the absence of acute myocardial infarction. No symptoms were found that could accurately predict the presence of acute myocardial infarction.

Pain in the right arm, sweating and palpitations may be predictive symptoms of the presence of acute myocardial infarction in people with chest pain. For people with various symptoms (e.g. symptoms of acute myocardial infarction or suspected coronary artery syndrome), the evidence is not consistent and pain in the right arm or shoulder and sweating may or may not be clinically helpful.

The following symptoms could not be considered clinically helpful in diagnosing acute myocardial infarction:

- pain in the right arm or shoulder
- pain in the left arm or shoulder
- pain in the neck or jaw
- central or right-sided chest pain
- sudden onset of pain
- substernal pain
- epigastric pain
- visceral pain
- aching

- oppressive, severe, burning or stabbing pain
- pain that lasts longer than 60 minutes
- time since onset of pain > 6 hours
- worsening pain after exertion
- nausea or vomiting
- shortness of breath
- sweating
- palpitations

The following symptoms could not be considered clinically helpful in diagnosing acute coronary syndrome:

- pain in the right arm or shoulder
- pain in the left arm or shoulder
- pain in both arms
- pain in the neck or jaw
- burning pain
- sudden onset of pain
- change in pattern of pain over the previous 24 hours
- worsening pain after exertion
- associated syncope
- nausea or vomiting
- sweating
- shortness of breath
- palpitations

The evidence is of low certainty. No new studies were identified in 2024.

Oxygen therapy

A Cochrane systematic review on oxygen use in people with a heart attack identified evidence from five randomized controlled trials that compared people who had a suspected or proven heart attack and were given inhaled oxygen to a similar group of people given air (Cabello et al., 2016). These trials involved a total of 1,173 participants, 32 of whom died. Death rates were similar in both groups (very low-certainty evidence). Regarding pain, there was no effect of oxygen on pain relief when pain was directly measured, nor when trials measured opiate use as a surrogate for pain (low-certainty evidence). Following a heart attack, there was no clear effect of oxygen on a range of complications in the oxygen group compared to the air group (low-certainty evidence).

Together, there is no evidence to support the routine use of inhaled oxygen in people with a heart attack, and we cannot rule out a harmful effect.

Acetylsalicylic acid

The ILCOR systematic review on first aid administration of acetylsalicylic acid (aspirin) for chest pain identified two observational studies and one randomized controlled trial that compared early (prehospital phase or within two hours from onset of chest pain) to late (more than two hours from onset of chest pain or in-hospital) administration of acetylsalicylic acid (Singletary et al., 2020a, Singletary et al., 2020b).

Very low-certainty evidence was identified from two observational studies showing improved survival (at seven days and 30 days) with the prehospital early administration of acetylsalicylic acid (median 1.6 hours from pain onset) compared to late administration of acetylsalicylic acid (median 3.5 hours from pain onset, given at hospital admission). One of these studies also showed an improvement in survival at one year (very low-certainty evidence). Very low-certainty

evidence was identified from two observational studies showing no significant difference in the incidence of complications, but they report inconsistent results about the incidence of cardiac arrest. Low-certainty evidence from one randomized controlled trial showed no benefit from giving enteric-coated acetylsalicylic acid within two hours of the onset of symptoms versus three to 24 hours after symptom onset on survival at 35 days. Very low-certainty evidence from two observational studies showed conflicting results: one of them showed a reduction in the incidence of asystole and the need for resuscitation with early (compared to late) administration, whereas the other study showed a higher incidence of ventricular tachycardia and fibrillation. Studies evaluating the timing of acetylsalicylic acid administration on cardiac functional outcome, infarct size and/or chest pain resolution could not be found.

Non-systematic reviews

Use of EMS

A 2002 study examined the use of EMS in the United States and ascertained the factors that may influence its use by people with acute chest pain. Only half of the people with chest pain were transported to the hospital by ambulance, and these people had greater and significantly faster receipt of initial reperfusion therapies. People who did not use the EMS were, on average, younger, male, and at relatively lower risk on presentation. Wider use of EMS by people with a suspected heart attack may offer considerable opportunity for improvement in public health (Canto et al., 2002).

Other sources

European Society of Cardiology Guidelines

The 2017 European Society of Cardiology Guidelines for the management of acute myocardial infarction in people presenting with a heart attack state the following:

- The early use of acetylsalicylic acid is confirmed.
- Give oxygen only to hypoxic people (oxygen is indicated in people with hypoxaemia: pulse oximetry reading < 90%)
- No mention of giving sublingual nitroglycerine routinely and contraindications beyond the learning requirements for first aid providers are listed (Ibanez et al., 2018).

Education reviews

Two papers provided insights about the education needed to help first aid providers recognize and act effectively when they witness acute chest pain.

National Heart Foundation “Warning Signs of Heart Attack” campaign

Cartledge et al. (2017) explored how awareness from a campaign about the barriers of calling EMS for acute coronary syndrome influenced people’s willingness to call. They found no association between having seen the campaign and calling EMS in a cohort of people with acute coronary syndrome. Barriers such as EMS response times or downplaying the seriousness of symptoms were still highly prevalent among the population of concern, despite the campaign’s targeted messages.

Though relatively small in quantitative terms, these findings point to cultural and social differences with regard to how people interpret and understand "symptom severity", and whether they are eligible to access EMS. For example, they may question if they actually need medical assistance or believe that what they are experiencing is not severe enough to "burden" EMS. The study revealed a disconnect between what people saw in the campaign and how it related to them. For example, they may have seen a visual of someone experiencing a heart attack but not associate the signs and symptoms with themselves when they experience it. This disconnect has implications for whether people seek help and for the outcomes of their health. These educational considerations can be applied to breathing difficulties as well.

Delayed hospital arrival

Brokalaki et al. (2011) undertook a two-year cross-sectional study among 477 heart attack patients in two large tertiary hospitals in Greece. They conducted structured face-to-face interviews. Information regarding people's socio-demographic characteristics, medical history and factors that might correlate with delayed hospital arrival were collected. The main significant factor connected with delayed hospital arrival among heart attack patients was the absence of another person (such as a companion or attendant) during the heart attack ($p = 0.049$). This correlation highlights the importance of teaching informal and formal caregivers about the signs and symptoms of a heart attack, as well as how to call for help immediately and provide first aid. The study reinforced the evidence that early hospital admission contributes significantly to the successful management of heart attacks, therefore also supporting the value of teaching recognition and immediate action in cases of suspected heart attacks (as potentially indicated by chest pain).

Stroke

Key action

Recognize the early signs of stroke and access emergency medical services (EMS) for help immediately.

Introduction

A stroke occurs when the blood flow to part of the brain is interrupted. This can be caused by bleeding in the brain or a blockage of a blood vessel, such as a blood clot. It can be very serious and requires immediate medical care. Stroke is the second leading cause of death and the third leading cause of disability (loss of vision, speech or partial or complete paralysis) (Johnson et al., 2016). Early admission to a medical facility greatly increases the chance of a positive outcome, so it is important for first aid providers to quickly recognize stroke symptoms and access EMS.

Guidelines

- First aid providers should use a stroke assessment system to recognize the symptoms of a stroke.**
    - First aid providers should use a stroke assessment system, such as FAST or CPSS (see below), to recognize the symptoms of a stroke.**
    - First aid providers may use stroke assessment systems that include blood glucose measurement, when available, such as MASS or LAPSS, to increase the specificity of stroke recognition.*
- First aid providers should NOT administer oxygen to a person experiencing a suspected stroke.**

Good practice points

- Mild stroke-like symptoms that last less than a few minutes indicate a transient ischaemic attack (TIA) or “mini stroke”. The person experiencing these symptoms should seek medical care as soon as possible to decrease the risk of more permanent outcomes.
- For a person showing stroke signs and/or experiencing stroke symptoms, EMS must be accessed as soon as possible.
- First aid providers should help the person get into the best possible position, keeping in mind the person’s comfort and physical and cognitive abilities. This may include lying on their back or sitting.

Chain of survival behaviours

Prevent and prepare

- There are national and global organizations that conduct research on how to reduce the likelihood of stroke. Refer to your country’s health authority for more information.

- Make healthy lifestyle choices to minimize certain risk factors such as high blood pressure, obesity, blood sugar level, hyperlipidaemia and renal dysfunction. Avoid activities such as smoking.

Early recognition

- There are a variety of acronyms in the English language to help recognize the signs and symptoms of stroke. FAST is recognized as an effective acronym for first aid providers. It reflects the need for early recognition and medical care, which improves the person's chances of a positive outcome.

FAST

F	Face	Facial numbness or weakness, especially on one side: ask the person to smile or show their teeth. Check if the person's mouth is crooked and whether one corner of their mouth is drooping.
A	Arm	Arm numbness or weakness, especially on one side: ask the person to extend both arms at the same time, straight out in front of them and ask them to turn their palms upwards. Carefully look if one arm is sagging or drifting around.
S	Speech	Abnormal speech, difficulty speaking or understanding others or a loss of speech. Ask the person or companions if there are any changes in their speech.
T	Time	Facial numbness or weakness, especially on one side: ask the person to smile or show their teeth. Check if the person's mouth is crooked and whether one corner of their mouth is drooping.

CPSS

The CPSS (Cincinnati Prehospital Stroke Scale) tests three signs for abnormal findings that may indicate that the person is having a stroke (FACE, ARM and SPEECH).

Signs of stroke

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body. The probability of stroke is likely if the person, when asked to:
    - show their teeth, the corner of their mouth droops
    - lift both arms with palms turned upwards while eyes are closed, one arm drifts or droops.

- Sudden confusion, trouble speaking or understanding. The probability of stroke is likely if the person, when asked to:
    - repeat a simple sentence, speech is unclear or slurred, or the words do not come easily.
- Sudden trouble in seeing with one or both eyes.
- Sudden trouble walking or experiencing dizziness, loss of balance or coordination.
- Sudden, severe headache with no known cause.
- Seizure (of a non-epileptic person).

First aid steps

1. Use a stroke assessment system to recognize the symptoms of a stroke.
2. If you suspect a stroke, access EMS immediately. Note the time it started.
3. Help the person get into the best possible position, keeping in mind the person's comfort and physical and cognitive abilities. Support them if they are at risk of falling.
4. Monitor the person's breathing and reassure them. Keep talking to the person.

If the person becomes unresponsive, open their airway and check their breathing. See unresponsive and breathing normally and Unresponsive and breathing abnormally (adolescent and adult). Note that similar symptoms may be caused by high or low blood sugar.

Access help

- Emphasize the signs and symptoms of stroke to the medical professional.
- The faster the person can get medical help, the less damage to the brain there may be, so it is important to get help quickly.

Recovery

- The signs of stroke indicate brain injury. Even if the person seems to have recovered, they should still access medical care.

Education considerations

Context considerations

- Learners' access to care, such as available transport or distance to the nearest medical facility, will vary depending on their local context. Work with learners to define what EMS access looks like in their community. In some settings, an ambulance will arrive within minutes after EMS is called, while in others, the ill or injured person may need to wait for a medical professional to come to them. In some cases, the first aid provider must transport the person to the medical facility by car, boat or other means.
- A quick response time is critical to caring for someone who is having a stroke. Understanding the EMS in their community builds learners' confidence to act quickly and determine the fastest method to transport the person to a medical facility.

- In many homes, there are ways to measure blood glucose because a family member has diabetes. If possible, the first-aid provider may be able to perform a blood glucose test for the person who has had a stroke and may use a stroke scale assessment, including glucose measurement, and communicate this to EMS.

Learner considerations

- Stroke knowledge, risk perception and effectiveness of educational media may differ between genders. Consider different educational interventions depending on the learner group (Marx et al., 2009).
- Use appropriate language levels according to the audience (e.g. adults or youth) and cultural context. Depending on learners' context, you may need to replace the phrase "call EMS" with "call a healthcare professional" or "ensure it is safe to travel to the medical facility" (Caminiti et al., 2017).

Facilitation tips

This section focuses on the following points:

- Challenges learners may encounter when applying their knowledge of stroke in real-life situations.
- How the facilitator can support learners in overcoming these challenges and confidently care for someone experiencing a stroke.

After leaving the learning environment, learners may struggle to recognize the signs of stroke or connect their recognition with the need to access EMS. This gap between their knowledge and application may be due to the following reasons:

- A stroke's visual cues are not the same in every person.
- Learners may not recognize the mild, temporary stroke-like symptoms that indicate a transient ischaemic attack (TIA) or "mini stroke". Recognizing the possibility of a TIA allows for early treatment and reduces the risk of a major stroke.
- Signs and symptoms may present gradually or be confused with another condition (e.g. a diabetic emergency).
- Learners often require more than one indicator to recognize stroke.
- The ill person may think the symptom they are experiencing is nothing serious (e.g. they may experience numbness but are still able to move). It is often a perceived seriousness of warning signs, rather than recognition that prompts first aid providers to access EMS.
- Many media campaigns and training videos only show severe strokes. This leads learners to believe that a stroke only occurs when several or all warning signs are severe or happen at the same time (Dombrowski et al., 2013).

The result of these challenges is a delay in accessing EMS, which can have negative results and limit care options. Because there is a limited timeframe to administer some medications and other treatments associated with caring for stroke, response time is critical. Emphasize that quick recognition and care results in the highest chance for a positive outcome (Maze & Bakas, 2004).

Design activities that will help learners to:

- Identify that their job as the first aid provider is to recognize the signs of a stroke and call EMS or get the person to a medical facility (Maze & Bakas, 2004).
- Develop an understanding of stroke (beyond using FAST) and recognize minor symptoms, such as impaired vision, unsteadiness and headache.
- Develop critical-thinking skills to determine when and how to respond.
- Understand the chain of people involved in providing immediate care to the person experiencing a stroke.
- Engage in the decision-making process of providing care.
- Consider the perceived risks, benefits and barriers to accessing EMS.
- Understand that a quick response time increases the possibility of treatment and recovery (Caminiti et al., 2017).

Design activities and training that support the above learning to help first aid providers trust in their ability to act quickly and effectively. This will help to reduce delays in care.

Facilitation tools

The intent of the learning activities developed for this topic is to build learners' confidence and connect their understanding of warning signs with actions (Caminiti et al., 2017). These activities are also an opportunity to reinforce positive behaviours.

- Use acronyms such as FAST to help quickly recall sequenced information (Bietzk et al., 2012; Robinson et al., 2012; Wolters et al., 2015).
    - The CPSS assessment tool contains similar physical signs to check (face droop, arm weakness, speech abnormalities). Therefore, you may want to consider adapting the acronym (while maintaining the signs, symptoms and actions to take) into a word that is more suitable in your language and therefore more accessible to your learners.

Where educators wish to use alternative stroke scale assessment tools such as MASS or LAPSS (because of the likelihood of a first aider being able to take a blood or glucose measurement, for example), ensure that this is both appropriate for your learners and authorized in your country.

- Use multiple resources such as media, community education and professional education when developing the lessons for this topic. A layered approach has been shown to successfully reduce prehospital delays (Becker et al., 2001; Caminiti et al., 2017; Flynn et al., 2014; Wall et al., 2008).
- Stories (either read or performed) and shared personal experiences can support learners' understanding of the topic, especially at low levels of education and literacy (Caminiti et al., 2017).
- Facilitate a session where learners build case studies and include details such as recognizing the early signs of stroke, accessing EMS and caring for the person while waiting for medical care (Wall et al., 2008).
- Facilitate a game where learners move to different parts of the room based on how much they agree or disagree with a statement. You can use this game to clarify the

misconceptions of stroke or as an introduction to identifying which signs are obvious or subtle.
- Explore scenarios that describe a variety of different situations or signs of stroke in detail. Ask learners how they would respond to each circumstance.

Learning connections

- A diabetic emergency can sometimes be mistaken for a stroke. If the person with suspected stroke has diabetes, help them measure their blood glucose level.
- Assessment: While waiting for EMS to arrive or while in transit to medical care, first aid providers should draw from previous learning and recognize the importance of maintaining the person's physical, mental and emotional safety.
- Recovery position: If the person becomes unresponsive, starts drooling or struggles to swallow, the first aid provider should place them on their side with their head tilted back.
- Psychological support: The first aid provider should monitor the person's condition and provide reassurance until medical care arrives. A stroke can be an extremely frightening experience, and this is an excellent opportunity to reinforce empathy and build confidence in learners' abilities to provide support to those affected.

Scientific foundation

Systematic reviews

Body position

The Centre for Evidence-Based Practice (CEBaP) developed an evidence summary on whether the positioning of a person with a stroke affects a variety of outcomes. This summary was updated in 2024 and identified one additional study.

There is limited evidence either in favour of lying flat on the back or sitting up. A statistically significant increase of a score of 0–2 and 0–6 on the modified Rankin Scale (mRS, a scale indicating the degree of disability) at 90 days could not be demonstrated for either position. Additionally, a statistically significant decrease in mortality, recurrent stroke, pneumonia, length of hospital stay and neurological deterioration could not be demonstrated for either position.

It was shown that lying flat resulted in a statistically significant decrease in mRS 0-2 (disability) and a statistically significant increase in general health score, compared to sitting up. However, the guideline developers did not consider these differences to be clinically relevant.

Evidence is of low certainty and results cannot be considered precise due to limited sample size, low number of events, lack of data and large variability of results.

Stroke screening assessment systems

The International Liaison Committee on Resuscitation (ILCOR) performed a systematic review on the use of stroke assessment systems to aid in the recognition of stroke by first aid providers (Singletary et al., 2020a, Singletary et al., 2020b, Meyran et al., 2020). An evidence update was conducted in 2024 and identified four new observational studies, but there were insufficient data to warrant a new or updated systematic review (Greif et al.; 2024a; Greif et al., 2024b).

For the critical outcome of time to treatment, ILCOR identified four observational studies evaluating four stroke scales.

- For the Kurashiki Prehospital Stroke Scale (KPSS), there is very low-certainty evidence from one observational study with 430 adults with suspected acute stroke. It reported an association between the use of the KPSS and an increase in the number of people with time from symptom onset to hospital arrival within three hours. Among people with emergency medical services where the KPSS was used, 62.9% arrived within three hours compared with 52.3% who did not have the scale applied. This same study reported an association between the prehospital use of the KPSS and a shorter elapsed time from symptom onset to hospital admission.
- For the Los Angeles Prehospital Stroke Scale (LAPSS), there is very low-certainty evidence from one observational study with 1,518 participants with a suspected acute stroke. The study reported an association between the use of LAPSS and an increased time from symptom onset to emergency department arrival. This same study found no benefit associated with the use of LAPSS in a prehospital setting for the rate of people admitted within 120 minutes.
- For the Ontario Prehospital Stroke Scale (OPSS), there was very low-certainty evidence from one observational study in 861 participants suspected of acute stroke. It showed an association between the use of OPSS and an increase in the number of people with time from symptom onset to hospital arrival within three hours.
- For the Face, Arm, Speech, Time, Emergency Response Protocol (FASTER), there is very low-certainty evidence from one observational study with 115 participants. It showed an association between the use of FASTER and a shortened time from symptom onset to time of a specific tissue treatment. Among people receiving the specific treatment, no differences were associated with or without the use of the stroke screening tool and time from symptom onset to hospital.

For the important outcome of recognition of stroke, with the outcome being a definitive stroke diagnosis or administration of thrombolytic therapy, they identified five observational studies evaluating five stroke scales:

- For FAST, there is low-certainty evidence from one observational study with 356 participants with suspected stroke. It showed an association between the use of FAST and an increase in the number of people with confirmed stroke or transient ischaemic attack who were admitted within three hours of symptom onset.
- For KPSS, there is low-certainty evidence from one observational study with 430 participants with suspected stroke. It showed no association between the use of KPSS and the receipt of thrombolytic therapy for people who were ultimately diagnosed with stroke.
- For LAPSS, there is moderate-certainty evidence from one observational study with 1,518 adults. It showed an association between the bundle of changes, including the use of LAPSS by paramedics, and an increase in the number of correct initial diagnoses of stroke confirmed by a neurologist. The same study showed no association between the rate of treatment with intravenous tissue plasminogen activator (TPA) among people with confirmed stroke and the bundle of changes including the use of LAPSS.

- For OPSS, there is low-certainty evidence from one observational study with 861 participants suspected of stroke. It showed no association between the use of OPSS and the rate of recognition of ischaemic stroke. This same study did show an association between the use of OPSS and an increase in the rate of thrombolytic therapy for all people with ischaemic stroke, as well as an association between the use of OPSS and an increased rate of thrombolytic therapy for people with ischaemic stroke arriving within three hours.
- For FASTER, there is very low-certainty evidence from one observational study including 181 participants with suspected acute stroke. It showed an association between the use of FASTER and the number of people who received thrombolytic therapy. Of patients who had the scale applied, 19.1% received thrombolytic therapy compared with 7.5% who did not have the scale applied.

When looking at studies investigating the correct stroke diagnosis, 19 observational studies were identified enrolling a total of 8,153 people and studying nine different stroke screening assessment systems. These studies were divided into subgroups based on whether the stroke scales included a glucose measurement or not.

Very low-certainty evidence was found on the important outcome of increased public recognition of stroke signs when using a stroke screening assessment system. One human study enrolling 72 members of the public measured the difference before training, immediately after, and three months after training. The study showed a benefit where 76.4% of participants (55/72) were able to identify stroke signs before training on how to use a stroke screening assessment system, compared with 94.4 % (68/72) immediately after training. Additionally, 96.9 % of participants (63/65) were able to identify stroke signs three months after training.

Supplementary oxygen

ILCOR conducted a systematic review of the use of supplementary oxygen for acute stroke and identified eight randomized controlled trials and one retrospective observational study (Singletary et al., 2020a; Singletary et al., 2020b). An evidence update in 2022 did not reveal new studies (Wyckoff et al., 2022b; Wyckoff et al., 2022c), but a more recent evidence update in 2024 identified two additional randomized controlled trials (Greif et al., 2024a; Greif et al., 2024b).

For the outcome of survival at one week, three months, six months and one year, no benefit could be shown of giving supplemental oxygen (moderate-certainty evidence from three randomized controlled trials). Also, for neurological outcomes at one week, three months or six months, no benefit could be shown in six randomized controlled trials and an observational study (moderate- to very low-certainty evidence). However, one of these trials showed a higher chance of improvement for one of its outcomes (improvement of NIHSS score of more than four at one week) (moderate-certainty evidence), and a separate randomized controlled trial also showed benefit at seven months (low-certainty evidence).

For the outcome quality of life, no benefit of supplementary oxygen was shown in two randomized controlled trials, and one trial even showed a lower quality of life (low-certainty evidence).

For the imaging outcome "lesion volume change at six hours, at 24 hours and at hospital discharge", no difference could be shown in one randomized controlled trial (low-certainty evidence).

One observational study also looked at complications and could not show an association between supplementary oxygen on the one hand and pneumonia at hospital discharge, and pulmonary edema and the use of non-invasive positive-pressure ventilation on the other hand, but showed a lower rate of hospital-acquired pneumonia and a higher rate of tracheal intubation and of respiratory complications (very low-certainty evidence).

Of the two newly identified randomized controlled trials, one study compared high-flow oxygen with no oxygen but did not find a significant difference in global disability scores. The other randomized controlled trial found better outcomes with normobaric hyperoxia compared with room air. Since these studies were not yet included in the systematic review, they had not yet been integrated into the Consensus on Science and Treatment Recommendations.

Education reviews

Campaigns to improve public recognition of stroke and instigate fast action to get the person to a medical facility have had mixed results. In general, evidence identifies that campaigns based on FAST can increase people's awareness of the need to act quickly and get the person to emergency medical care following the identification of one or more signs from the FAST mnemonic.

Wolters et al. (2015) retrospectively considered 668 consecutive patients with stroke between 2002–2008 and 2009–2013. In between these time intervals, a national television campaign on stroke recognition and how to act (based on FAST) ran. Results showed that patients were statistically more likely to seek medical care within three hours after seeing the campaign. The median time to get medical attention fell from 53 to 31 minutes, and arrival at the hospital fell from 185 to 119 minutes post-campaign.

Robinson et al. (2012) surveyed 1,300 people in Leicester (UK) following a campaign on stroke recognition (FAST) and found that participants strongly remembered the campaign and the mnemonic elements. After surveying 356 adults in Birmingham (UK) following the same campaign, Beizk (2012) found that 64.9% were aware of the FAST campaign. Of this percentage however, 32.5% could not recall any letters, 9.5% remembered one, 13.0% two, 17.3% three and 27.7% all four correctly.

Wall et al. (2008) identified low-quality evidence that training leads to an increase in the ability to identify signs of a stroke. After training, those able to identify the signs rose from 76.4% to 94.4%. Additionally, 96.9% of participants were able to identify the signs of stroke three months after training.

Caminiti et al. (2013) describe a study to develop a campaign aimed at increasing stroke awareness and preparedness. They found that integrating theory with the information collected from target populations enabled them to create effective tools for that audience.

Bray et al. (2010) interviewed 100 stroke patients and 70 bystanders following two separate stroke awareness campaigns in Australia. 12% were aware of the campaign, and of these, 19% could recall stroke symptoms.

Flynn et al. (2014) conducted an interrupted time series to consider the impact of a UK stroke campaign completed in 2007–2011. They found a statistically significant increase in information-seeking behaviour and emergency admissions for stroke. They also noted a decrease in inappropriate care-seeking and thrombolysis activity that could be attributed to the campaign.

Additional information

Prevention

In analyses using data from the Global Burden of Disease Study, approximately 90% of stroke risk could be attributed to modifiable risk factors (such as high blood pressure, obesity, hyperglycaemia, hyperlipidaemia and renal dysfunction), and 74% could be attributed to behavioural risk factors (such as smoking, sedentary lifestyle and an unhealthy diet). Globally, 29% of the risk of stroke was attributable to air pollution. Although global age-adjusted mortality rates for ischaemic and haemorrhagic stroke decreased between 1990 and 2015, the absolute number of people who have strokes annually, as well as related deaths and disability-adjusted life-years lost, increased. The majority of global stroke burden is in low- and middle-income countries (Benjamin et al., 2019).

Allergic reaction and anaphylaxis

Key action

Stop further contact with the allergen and help the person to use their medication.

Introduction

Allergies are relatively common, presenting on the skin (hives, itching, swelling), or in the airways (sneezing, snuffles) and sometimes accompanied by gastrointestinal symptoms (cramps, diarrhoea). Chronic allergic disease (e.g. atopic eczema) sometimes deteriorates suddenly. Some people can also be severely allergic to something, resulting in a life-threatening anaphylactic reaction (a very severe allergic reaction). Many people with a history of anaphylaxis carry a lifesaving epinephrine autoinjector.

Guidelines

Anaphylaxis

- First aid providers should have repeated training sessions and encounters with people experiencing anaphylaxis before they are expected to recognize the signs and symptoms.**
- Epinephrine should be used intramuscularly to treat anaphylaxis using the person's prescribed autoinjector.**
- For a person with symptoms of anaphylaxis who has been treated by, but did not respond to, epinephrine within five to ten minutes, a second dose may be considered if emergency medical services (EMS) have not arrived yet.*

Mild allergic reaction

- Using moisturisers in case of atopic eczema or dermatitis may relieve the symptoms.*
- Rinsing the eyes or nasal cavity with saline may relieve symptoms of hay fever.*
- If local regulations allow, a trained first aid provider may give common antiallergic medication (antihistamine or corticosteroid tablet) if the person does not have these with them.*

Good practice points

- The person should be asked about any known allergies and prescribed medication.
- Epinephrine can be used intranasally to treat anaphylaxis using the person's prescribed medication.
- If appropriate, the allergen should be removed (e.g. from the skin) or the person should be removed from the environment containing the allergen (e.g. a chemical).
- The first aid provider should help the person to get into a comfortable position and to take their prescribed medication if the person has it with them.

Anaphylaxis

- First aid providers should be trained in recognizing the signs and symptoms of anaphylaxis.
- First aid providers should be familiar with the epinephrine autoinjector, so that they can help someone having an anaphylactic reaction self-administer their epinephrine, if local law permits.
- First aid providers may be permitted to use an epinephrine autoinjector if the person is unable to do so, provided that a doctor has prescribed the medication and local law permits.
- Epinephrine should be given when symptoms of anaphylaxis are present. Inappropriate use of an epinephrine autoinjector (in a case of misdiagnosis, incorrect route of administration, inadvertent intravenous administration or administration of an excessive dose of epinephrine) may result in adverse reactions.
- The epinephrine auto-injection may be administered through the person's clothing if the clothes are not thick.
- First aid providers should access EMS when a severe allergic reaction (anaphylaxis) is suspected or recognized in a person.
- Unless the doctor's prescription is different, for children between 15 kg and 30 kg bodyweight, an epinephrine dose of 0.15 mg is recommended intramuscularly. For children over 30 kg, epinephrine is recommended in a dose of 0.3 mg, and for adults, the recommended dose is 0.5 mg.
- First aid providers should be aware that an anaphylactic reaction can be biphasic (symptoms recur after complete improvement) between one and 78 hours after the initial onset. Biphasic anaphylaxis is associated with the initial presentation of anaphylaxis that is more severe or needs more than one dose of epinephrine. In these instances, the person should be observed in case of a second reaction.

Mild allergic reaction

- In case of an allergic reaction to the skin, advise the person not to rub the skin, as this may exacerbate the itch.
- In the case of hay fever, rinsing the eye or nose may offer some relief.
- The first aid provider should monitor the person closely, as a mild allergic reaction can develop into a severe allergic reaction.

Chain of survival behaviours

Prevent and prepare

- Prevention is of utmost importance. Anyone with a known allergy should avoid any contact with the allergen.
- Ensure a person with a known allergy carries an allergy card (describing their allergy) and their prescribed medication at all times, and that caregivers know where the medication can be found.

- Teach those with a known allergy, as well as their caregivers, to recognize the signs and symptoms of a severe allergic reaction, when and why to access EMS and how to use the epinephrine autoinjector.
- Consider food labelling at home and about.
- Be aware of the most common allergens causing anaphylaxis (foods, insect venoms, medication and latex).

Early recognition

Unless the allergic reaction is the first one in the life of the person, the person usually knows they are allergic to a certain substance and may carry some antiallergic medicine with them. Ask the person if they have any known allergies.

You may notice the person has had contact with a common allergen.

A mild allergic reaction will vary depending on what is causing it but may include:

- red, itchy eyes
- sneezing, snuffles or runny nose
- abdominal cramps, diarrhoea and vomiting
- itching, swelling or hives on the skin, including the face.

A severe allergic reaction (anaphylaxis) is likely to develop further and include life-threatening conditions such as:

- difficulty breathing, including shortness of breath, wheezing or asthma-like appearance
- airway narrowing, swelling of the tongue, throat and larynx, causing hoarseness, noisy breathing. Often, the first symptom to occur is difficulty swallowing.
- signs of shock including confusion or agitation, pale or ashen skin, which may lead to collapse and unresponsiveness.

The severity of anaphylaxis can differ from one person to another, and even in the same person from one episode to another. A mild allergic reaction may unpredictably progress to life-threatening anaphylaxis in minutes. Therefore, high alertness is required in treating a suspected anaphylactic reaction.

First aid steps

Anaphylaxis

1. Access EMS as soon as you recognize that the person is experiencing a severe allergic reaction.
2. Help the person to lie down unless they are experiencing breathing difficulties. In that case, help them to sit down.
3. If the person has an epinephrine autoinjector, help them use it. The best place for injection is the middle of the outer side of the thigh. The injection can be administered through clothes if the clothes are not thick.

4. If a person with symptoms of severe allergic reaction was treated with but did not respond to the first dose of epinephrine within five to ten minutes, a second dose may be considered.
5. Keep monitoring the person's responsiveness and breathing regularly until EMS is accessed.

Follow the usual rules for drug and medical device disposal after the autoinjector has been used.

Local adaptation

If an epinephrine autoinjector is not available, access EMS immediately.

While waiting for medical assistance, alternative medicines can be used after medical advice, such as antihistamines or corticosteroids.

CAUTION

First aid providers should be aware that use of epinephrine may have side effects (some of which may also result from an anaphylactic reaction):

- faster (pounding), sometimes irregular heartbeat
- excitement, anxiety or fear
- weakness or shakiness
- nausea and vomiting
- throbbing headache
- dizziness
- paleness
- sweating.

Mild allergic reaction

1. Ask the person about known allergies and any prescribed medication.
2. If appropriate, remove the allergen (e.g. by rinsing from the skin) or remove the person from the environment containing the allergen.
3. Help the person get into a comfortable position and take their medication if they have it with them. If trained to do so and local regulations permit, offer the person common antiallergic medication or remedies.
4. In case of an allergic reaction to the skin, advise the person not to rub the skin, as this may make it itch more.
5. Monitor the person closely, as a mild allergic reaction can develop into a severe allergic reaction.

- An antihistamine or corticosteroid medication may be given to the person.
- For hay fever, rinsing the eyes or nasal cavity with saline may relieve symptoms.
- In the case of hives, an anti-itch ointment might help. Advise the person to seek help from their doctor or pharmacist.
- In the case of eczema, applying moisturiser or using an anti-itch ointment may help.

- Advise the person that some antihistamines could cause drowsiness and diminish the reflexes needed for safe driving or working with a dangerous machine. This is more pronounced with the first generation of antihistamines. Even a small amount of alcohol may enhance these side effects.

Access help

Anaphylaxis

- Anaphylaxis is a life-threatening condition requiring urgent medical attention. As soon as you suspect a severe allergic reaction, access EMS.
- Ensure you tell EMS if the person has received an epinephrine injection.

Mild allergic reaction

Advise the person to seek medical advice:

- In the case of hives: if the allergic reaction to the skin is very bothersome and does not improve over a couple of days.
- In the case of eczema: if it is the first time the allergic reaction occurs, or if the skin lesions are accompanied by signs of infection, such as fever or feeling unwell.
- In the case of hay fever: if it is the first time the allergic reaction occurs.

Recovery

- Ensure that a person who has a severe reaction or requires an epinephrine injection is monitored for the three days following a reaction, as a severe allergic reaction may recur.
- A person who has experienced a severe allergic reaction should keep an allergy card (explaining their allergy) with them at all times.

Education considerations

Context considerations

- Programme designers should be mindful of local legislation and regulations that could affect what should be taught.
- Preparation, planning and training are needed, particularly in high-risk environments, to encourage quick action for anaphylaxis during an emergency.
- Some learners may work in environments (e.g. school, day-care) where they will have a different scope of practice to first aid providers. For example, they might have a responsibility to administer medication. They may also have access to epinephrine as part of their facility supplies or may be reliant on individual users who have it on prescription from their doctor.
- Focus education on preparedness and prevention in remote contexts where access to medical supplies and EMS may be challenging. Likewise, people with a known allergy who are visiting remote places should take adequate supplies of antihistamine or epinephrine, tell others where they are going and when they expect to return, and research which allergens they need to be alert and avoid.

Learner considerations

- Consider how you may uniquely prepare people (healthcare professionals, parents of young children, etc.) to help someone in case of a severe allergic reaction. Be aware that in learning design, young people are susceptible to certain factors that may delay the recognition of an anaphylactic episode. They tend to have higher risk behaviour, potentially leading them to disregard triggers of anaphylaxis. They also try to hide their allergy problems from others, avoid epinephrine autoinjectors and seek medical care only at late stages of the reaction. The first experiences with alcohol may also act as a cofactor of severity.
- Schools may have policies and practices of which school staff need to be aware. Where these do not exist, learners who work in schools should be encouraged to develop safe and effective policies and protocols (Morris et al., 2011).
- A wider educational approach to this topic may be useful for caregivers of people with severe allergies, including practical considerations such as food labelling and psychological considerations, such as how to cope with the anxiety of someone vulnerable to anaphylaxis (Brockow et al., 2015).
- Decision-making about how to respond can be challenging for learners (deciding to give the injection, whether to repeat the dose and how to access help). Often, they need to acknowledge several symptoms to recognize the significance of the situation (Simons et al., 2009).
- Help learners think through how they can help themselves if they are alone when they experience an allergic reaction or anaphylaxis.
- Help any learner with an epinephrine autoinjector to develop a personalized emergency action plan if they do not have one already.

Facilitation tips and tools

- It is valuable to emphasize the importance of a prescription of epinephrine autoinjector for those at risk, the key signs and symptoms which indicate a need for an auto-injection, administering epinephrine (having it available, when to use it and how to use it) as well as the importance of accessing medical care after administration (Simons et al., 2009).
- Use a training autoinjector to demonstrate its use to learners. If using a real autoinjector, ensure it does not contain any medication, and take care to remove the risks of a learner coming in contact with a sharp needle. Do not use live medications for demonstrations.
- There are different types of auto-injectors. For instance, the needle is visible in some but not in others. First aid providers should know the main types and the principles of their function so use a variety of trainer examples in sessions (Ring et al., 2018).
- Emphasize that the user should hold the device pressed down for about three seconds to allow the entire dose to be administered.
- Delayed injection of epinephrine is associated with higher hospitalization and mortality rates, while prompt administration of epinephrine is associated with better outcomes (Alvarez-Perea et al., 2017).
- First aid providers not trained in using an autoinjector may not be able to quickly learn how to use it properly. In an emergency, there may not be time to read the instructions for use. So, practice is essential.

- Reassure learners that epinephrine autoinjectors are safe to use in the event of someone having a severe allergic reaction.

Facilitation tools

- Beyond learning the first aid steps, focus on building learner confidence and ability by providing opportunities to practise decision-making (possibly through a scenario or case-based learning) to encourage quick action (Litarowsky et al., 2004).
- Using a peer education approach, whereby learners are encouraged to teach their families and friends about this topic, could be beneficial to the wider community (Brockow et al., 2015).
- Regular practice and refreshing (small-dose, high-frequency learning) can be helpful in maintaining confidence/self-efficacy (Arkwright & Farragher, 2006).

Scientific foundation

Systematic reviews

Anaphylaxis

In 2015, the International Liaison Committee on Resuscitation (ILCOR) conducted a systematic review on the benefit of a second dose of epinephrine for severe anaphylaxis when signs and symptoms fail to respond to an initial dose. Based on very low-certainty evidence from nine observational studies, it was shown that the resolution of symptoms improved when giving a second dose to people not responding to a first dose (Singletary et al., 2015; Zideman et al., 2015;). The review was updated in 2021 but did not result in any new studies (Wyckoff et al., 2021; Wyckoff et al., 2022a). However, it was updated again in 2024, resulting in one new observational study, confirming previous findings (Greif et al., 2024a; Greif et al., 2024b). Based on the evidence updates, it was decided not to conduct a formal systematic review update.

Another review based on observational studies and case studies on the recognition of anaphylaxis concluded that first aid providers have difficulties recognizing signs and symptoms of anaphylaxis (Markenson, 2010). The review was updated with a scoping review in 2020 (Singletary et al., 2020a; Singletary et al., 2020b), an evidence update in 2022 (Wyckoff et al., 2022b; Wyckoff et al., 2022c), and an additional scoping review in 2023 (Berg et al., 2023a; Berg et al., 2023b). No studies were identified regarding first aid providers' ability to recognize the signs and symptoms of anaphylaxis, but several educational studies were found that focus on training how to use epinephrine autoinjectors. Based on the scoping reviews and evidence update, it was decided not to conduct a formal systematic review update. The treatment recommendation, stating that first aid providers should not be expected to recognize the signs and symptoms of anaphylaxis without repeated episodes of training and encounters with victims of anaphylaxis, remains unchanged.

A comprehensive systematic review of the topic (Shaker et al., 2020) summarizes current knowledge. It underlines that, due to human anaphylaxis being a potentially fatal, acute condition, ethical considerations make double-blind studies almost impossible. This limits the

availability of evidence. Some highlights here are either confirming our former knowledge or updating certain points:

- The lifetime prevalence of anaphylaxis has been estimated at 1.6% to 5.1%, and recent studies demonstrated the rate of biphasic reactions closer to 4% to 5%.
- While diagnostic criteria for anaphylaxis (Sampson et al., 2006) are very sensitive and quite specific, fulfilling these is not a prerequisite for epinephrine administration in a person experiencing an acute allergic reaction.
- US, European and international anaphylaxis guidelines recommend intramuscular epinephrine in the front and outer sides (anterolateral) of the thigh rather than subcutaneous epinephrine in the upper muscle of the shoulder (deltoid) for the treatment of anaphylaxis. This is based on a limited number of studies in volunteers (not in anaphylaxis) that demonstrated that when administered intramuscularly into the thigh, epinephrine works rapidly and reaches maximal efficacy within ten minutes of injection, though no proof exists that subcutaneous delivery is not effective.
- Epinephrine administered intramuscularly (in a dose of 0.01 mg/kg of a 1:1000 [1 mg/mL] solution to a maximum of 0.5 mg in adults and 0.3 mg in children) into the front and outer sides (anterolateral) of the thigh is the first-line treatment for anaphylaxis. The availability of newer auto-injector dose formulations (0.1 mg for infants) allows greater epinephrine dosing accuracy. However, a 0.15-mg intramuscular dose is also widely prescribed for infants at risk for anaphylaxis. Particularly in settings where a 0.1-mg autoinjector dose is not available, the speed and precision gained from a 0.15-mg auto-injector dose compared with having caregivers draw up doses using a syringe method may justify trade-offs in dosing accuracy, especially in infants weighing more than 7.5 kg. Depending on the response to the initial injection, the dose can be repeated every five to 15 minutes.
- Biphasic anaphylaxis is a well-recognized potential complication of anaphylaxis and has been defined as recurrent anaphylaxis after complete improvement. This has been reported to occur between one and 78 hours after the onset of the initial anaphylactic reaction, and this must be clinically differentiated from a reaction that does not fully respond to initial treatment and persists or quickly returns.
- Biphasic anaphylaxis is associated with a more severe initial presentation of anaphylaxis or repeated epinephrine doses (i.e. more than one dose of epinephrine) required with the initial presentation (very low certainty evidence). A person presenting with severe anaphylaxis or requiring more aggressive treatment (e.g. more than one dose of epinephrine) should be considered for longer observation time for a potential biphasic reaction following complete resolution of signs and symptoms. Certainty rating of evidence: very low.

Shaker et al. (2020) provide some additional good practice statements for anaphylaxis:

- Administer epinephrine as the first-line treatment for anaphylaxis and biphasic anaphylaxis.
- Do not delay the administration of epinephrine for anaphylaxis, as doing so may be associated with higher morbidity and mortality.

- After recognition and treatment of anaphylaxis, the person should be kept under observation in a setting capable of managing anaphylaxis until symptoms have fully resolved.

Allergic reaction

The Centre for Evidence-Based Practice (CEBaP) developed four evidence summaries for eczema or hives and hay fever.

Use of moisturisers in atopic eczema or dermatitis

CEBaP found moderate-certainty evidence from one Cochrane systematic review showing that using moisturisers resulted in a statistically significantly increased number of people experiencing good improvement and a statistically significant decrease in disease severity and itch in people with a flare of atopic eczema or dermatitis. Any adverse event or a statistically significant change in their quality of life could not be demonstrated. This evidence summary was declared stable and was not updated further.

Cooling the skin for itching or weals (eczema, hives)

CEBaP identified very low-certainty evidence from four randomized controlled trials. It was shown that cooling the skin to temperatures less than 22°C resulted in a statistically significant decrease in itch intensity, weal size and flare size, compared to not lowering the skin temperature or maintaining a skin temperature of 32°C (in three studies). However, a statistically significant decrease in itch intensity or weal size when cooling the skin to 28°C compared to maintaining skin temperature of 32°C, or a statistically significant decrease in weal diameter when cooling the skin to 22°C, compared to not lowering the skin temperature, could not be demonstrated in two studies. A statistically significant decreased risk of itch resolution or reduction when cooling the skin to 10°C, compared to heating the skin to 45°C, could not be demonstrated in one study. No new studies were identified following the update of this summary.

Use of antihistamines in cold urticaria (hives)

Since the choice and availability of antihistamines is the responsibility of medical professionals, this evidence summary was not updated.

First-generation H1-antihistamines

There is limited evidence either in favour of first-generation oral H1-antihistamines or a placebo. A statistically significant increase in the rate of complete response, using first-generation H1-antihistamines compared to placebo, could not be demonstrated. However, it was shown that first-generation H1-antihistamines were associated with a statistically significant increased occurrence of adverse events, compared to placebo. Evidence is of low certainty.

Second-generation H1-antihistamines

There is limited evidence in favour of second-generation oral H1-antihistamines. It was shown that second-generation H1-antihistamines resulted in a statistically significant increase in the rate of complete response, compared to placebo. However, it was shown that second-generation

H1-antihistamines were associated with a statistically significant increased occurrence of adverse events, compared to placebo. Evidence is of low certainty.

H2-antihistamines

No relevant studies comparing oral H2-antihistamines to placebo could be identified.

Use of antihistamines in eczema

CEBaP identified low-certainty evidence from two systematic reviews for the use of antihistamines in eczema.

Oral H1-antihistamines compared to placebo

No relevant studies comparing oral H1-antihistamines to placebo could be identified.

Oral H1-antihistamines and topical treatment compared to placebo and topical treatment

There is limited evidence neither in favour of combining topical treatment with H1-antihistamines nor of combining it with a placebo. A statistically significant change in the rate of response, overall response rate, and physician-assessed number of people for whom treatment helped itching or reported pruritus, could not be demonstrated when using the combination of topical treatment and oral H1-antihistamines compared to the combination of placebo with topical treatment. It was, however, shown that Fexofenadine resulted in a statistically significant increase in reported change in pruritus, compared to placebo. Additionally, it was demonstrated that Acrivastine resulted in a statistically significant increase in the physician-assessed number of people for whom treatment helped itching, compared to placebo. A statistically significant increased occurrence of adverse events, using the combination of topical treatment and oral H1-antihistamines compared to the combination of placebo with topical treatment, could not be demonstrated.

Nasal rinsing for hay fever

CEBaP identified low-certainty evidence from one Cochrane systematic review on nasal rinsing for hay fever. There is limited evidence in favour of nasal irrigation with saline. It was shown that nasal irrigation with saline, compared to no irrigation, resulted in a statistically significant decrease in disease severity scores within four weeks and between four weeks and six months. A statistically significant increase in health-related quality of life within four weeks or between four weeks and six months could not be demonstrated. No new studies were identified following the update of this summary.

Eye rinsing for hay fever

CEBaP identified very low-certainty evidence from one non-randomized controlled trial on eye rinsing for hay fever. There is limited evidence in favour of eye rinsing. It was shown that eye rinsing resulted in a statistically significant change in overall improvement, compared to no eye rinsing. A statistically significant change in clearness, redness and comfort when eye rinsing, compared to no eye rinsing, could not be demonstrated. No new studies were identified following the update of this summary.

Non-systematic reviews

Autoinjectors

Sicherer and Simons (2017) state that while epinephrine autoinjectors are usually prescribed for people with a history of anaphylaxis, they may also be prescribed for some people at high risk without a history of anaphylaxis. Epinephrine autoinjectors are best prescribed in the context of a written, personalized anaphylaxis emergency action plan, developed by the doctor with input from the family. It is important to teach people and caregivers how to recognize anaphylaxis symptoms; when, why and how to use an epinephrine autoinjector; and the rationale for accessing EMS. Morris et al. (2011) support this with a call to schools to develop safe and effective policies and protocols in order to support the school community to respond effectively in the event of someone having an allergic reaction.

Simons et al. (2009) report a study of survivors of anaphylaxis in a community using a survey. In this study, more than half the responders reported problems in using the autoinjector. Such problems included knowing when to use it, how to decide whether to give a second dose and how to use it. The authors conclude that there is a need for greater guidance to those with prescribed autoinjectors on when and how to use them, the signs and symptoms of anaphylaxis and recovery actions.

Ring et al. (2018) conducted a selective literature search between 2007 and 2014. The authors stress that several epinephrine autoinjector types are available, differing in dose, shelf life, needle length and usage technique. Their use needs to be learned and practised, meaning that they are not simply interchangeable.

Incidence of anaphylaxis

Lee et al. (2017), in the framework of the Rochester Epidemiology Project, performed a population-based incidence study in Olmsted County, Minnesota, from 2001 to 2010. This showed a 4.3% increase per year in the incidence rate of anaphylaxis.

Recognizing anaphylaxis

Sampson (2006) states that anaphylaxis is highly likely when any one of the following three criteria is fulfilled:

1. Acute onset of an illness (minutes to several hours) with the involvement of the skin, mucosal tissue or both (e.g. generalized hives, pruritus or flushing, swollen lips-tongue-uvula) and at least one of the following:
    a. Breathing difficulties (wheezing, high-pitched wheezing, hypoxia).
    b. Reduced blood pressure or associated symptoms (e.g. feeling faint, fainting or becoming unresponsive).
2. Two or more of the following occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):
    a. Involvement of the skin-mucosal tissue (e.g. generalized hives, itch-flush, swollen lips-tongue-uvula).
    b. Breathing difficulties (wheezing, high-pitched wheezing, hypoxia).

    c. Reduced blood pressure or associated symptoms (e.g. feeling faint, fainting or becoming unresponsive).
    d. Persistent gastrointestinal symptoms (e.g. cramp, abdominal pain, vomiting).
3. Reduced blood pressure after exposure to a known allergen for that person (minutes to several hours):
    a. Babies and children: low blood pressure (age-specific).
    b. Adults: blood pressure of less than 90 mm Hg.

Managing anaphylaxis

A narrative review by Alvarez-Perea et al. (2017) reports that delayed injection of epinephrine is associated with higher hospitalization and mortality rates. In contrast, prompt prehospital administration of epinephrine is associated with better outcomes. The review also suggests that after administration of epinephrine, people with anaphylaxis should not be in an upright position but should be placed on their back with their lower limbs elevated and if possible, supplemental oxygen should be given.

The review also states that adolescents are at greater risk of anaphylaxis owing to the intrinsic characteristics of this age group. Adolescents tend to have higher risk behaviour, thus potentially leading them to disregard triggers of anaphylaxis. They also try to hide their allergy problems from others, avoid epinephrine autoinjectors and seek medical care only at late stages of the reaction. These factors may delay the recognition of an episode of anaphylaxis. Management of anaphylaxis in adolescents presenting at the emergency department may be hampered by misinformation (e.g. lessening of symptoms, hiding triggers). The first experiences with alcohol may worsen the severity of anaphylaxis.

Shock

Key action

Identify the signs of shock and provide care to minimize stress on the body and support blood circulation to the brain and heart.

Introduction

A person experiences shock when their circulation system fails and major organs and tissues do not receive enough blood (and therefore, oxygen). A common cause of shock is severe bleeding, including external and internal bleeding. Very serious burns cause leaking of fluids from the blood vessels into the burn and may result in shock. A person experiencing problems with their heart (e.g. a heart attack) may not have enough blood pumped around the body, which may also cause shock. Anaphylaxis is also a cause of shock as the blood vessels dilate, which causes low blood pressure. The first aid provider's priority needs to be on identifying shock and initiating care of the cause if it is evident.

Guidelines

- The person in shock should be placed in a supine position (lying on their back).**

Good practice points

- Emergency medical care should be accessed immediately if it appears the person shows signs of shock.
- As shock is caused by many other conditions, the first aid provider's priority should be to identify and manage the cause if possible.
- If a heart attack is suspected of causing shock, consider placing the person in a supine position with the upper body slightly elevated.
- If the person has difficulty breathing or is uncomfortable lying on their back, they may be placed in the position most comfortable to them, such as sitting while leaning back or leaning forward.
- After the person has been helped to lie on their back, if it makes the person feel better, the first aid provider may raise the person's legs 30 to 60 degrees (also called passive leg raising), provided there is no history of trauma.
- First aid providers should help the person maintain a normal body temperature (i.e. prevent heat loss in a cold environment and prevent overheating in a hot environment) to reduce stress.

Chain of survival behaviours

Prevent and prepare

- Shock is caused by many other conditions and it is vital to provide care for the condition, such as:

- If a person is losing a lot of blood, the first aid provider should apply pressure to the bleeding and keep the person warm. Observe for signs of shock.
- If the person is having a severe allergic reaction and has a known allergy requiring them to carry epinephrine or other medications, help them to take their own medication.

Early recognition

Shock is caused by other conditions, usually severe bleeding. Sometimes heart attack, severe burns, an infection such as sepsis or a severe allergic reaction.

In addition to the signs of one of these conditions, the person may also:

- have ashen or pale skin with bluish lips, ears and fingers
- have cool or clammy skin
- sweat and shiver
- feel weak, tired or dizzy
- Have rapid breathing and pulse
- display an altered mental status (anxious, sleepy).

First aid steps

1. Help the person to lie down on their back (or in a comfortable position).
2. Provide care for the cause of shock if possible. For example, apply pressure to a severe bleed or help them take their medication if they are having a severe allergic reaction.
3. Access EMS immediately.
4. Continue to provide care for the cause of the shock if possible.
5. Keep the person warm. Cover them with a blanket or clothing and protect them from the ground if it is cold.
6. Reassure the person by talking to them. Monitor their responsiveness and breathing regularly.

- If the person is unresponsive with abnormal breathing, begin CPR.
- After the person has been moved to lie on their back, if it makes the person feel better, you could raise their legs 30 to 60 degrees if they are uninjured.

Access help

Clearly explain to EMS about the person's condition, signs of shock and what the cause may be. Shock is a life-threatening condition so emergency medical care is needed.

Education considerations

Facilitation tips and tools

- As many illnesses or injuries can lead to shock, facilitate the treatment for shock early in the programme and re-emphasize it throughout the learning.

- Because shock is always present with another condition, and clinically speaking, there are several different types of shock, learners may find the topic confusing which may reduce their confidence to act. Try to keep the topic simple, emphasizing the common cause (failure of getting oxygenated blood to the body), the common recognition points and the first aid steps.
- Emphasize that the best way to treat shock is to effectively treat the condition causing the shock, for example, to apply pressure to a bleed.
- Learners' actions in treating shock should not interfere with their treatment of the causing condition and should not negatively impact the comfort of the ill or injured person. For example, a person experiencing shock due to a heart attack may be more comfortable sitting than lying down.
- Clarify if necessary that shock, as described here, is different from emotional shock. Shock is a life-threatening condition due to a severe illness or injury that causes the circulation system to fail. Whereas emotional shock or feeling shocked is a psychological response to an event. See Traumatic event.

Learning connections

- Help learners make connections to the causes of shock, including a heart attack, severe bleeding, fractures, sprains and strains, severe allergic reaction and infection such as sepsis.

Scientific foundation

The Centre for Evidence-based Practice (CEBaP) conducted an evidence summary on the shock symptoms that could be assessed by lay people, but found no relevant studies.

In addition, a formal scientific review on the optimal position for shock was carried out in 2015 by the International Liaison Committee on Resuscitation (ILCOR) (Singletary et al., 2105; Zideman et al., 2015). An update in 2020 did not identify any new evidence (Singletary et al., 2020a; Singletary et al., 2020b).

Low-certainty evidence from one randomized controlled trial and five observational studies was identified with benefits for the supine position (lying on the back) to improve vital signs and cardiac function, compared to an alternative position.

ILCOR recognized that for people with no evidence of trauma, the use of passive leg raising may provide additional, temporary improvement. The clinical significance of this improvement is uncertain. Therefore, ILCOR did not make a recommendation concerning passive leg raising. They were also unable to identify an optimal degree of elevation; studies range between 30 and 60 degrees elevated. No study has reported negative effects due to passive leg raising.

Diabetic emergency (hypoglycemia)

Key action

Give the person something sweet to eat or drink to raise their blood sugar level (in the case of low blood sugar).

Introduction

Diabetes is a chronic condition in which the body struggles to produce or respond to insulin, the hormone that regulates blood sugar levels. A diabetic emergency happens when a person's blood glucose level goes outside the normal range, resulting in either too much sugar in the blood (hyperglycaemia) or too little sugar in the blood (hypoglycaemia). 442 million adults have diabetes worldwide, or one in 11 people. The number of diabetes cases worldwide has quadrupled since 1990 (World Health Organization, 2024a). A high blood sugar level (hyperglycaemia) may evolve gradually and can be asymptomatic for several hours or even days. A low blood sugar level (hypoglycaemia) is usually sudden and life-threatening and therefore forms the focus of this topic.

Guidelines

- Oral glucose administration (swallowing or eating glucose) should be used for an adult or child with suspected hypoglycaemia who is responsive and able to swallow.**
    - First aid providers should give glucose tablets to a person who has symptoms of hypoglycaemia and is responsive.**
    - If glucose tablets are not available, various forms of dietary sugars such as Skittles, Mentos, sugar cubes, jellybeans or orange juice can be used to treat the symptoms of hypoglycaemia in a responsive person.*
- If oral glucose (e.g. tablets or dietary sugars) is not available, a glucose gel can be given to an adult or child with suspected hypoglycaemia who is responsive and able to swallow. These gels are both absorbed into the cheeks (buccal) and swallowed (oral).*
- Sublingual glucose administration (putting glucose under the tongue) may be used for suspected hypoglycaemia in children who may be uncooperative with swallowing a glucose substance.*

Good practice points

- 15g to 20g of glucose tablets should be used to treat symptomatic hypoglycaemia in responsive babies, children and adults.
- Glucose administration should be repeated if symptoms continue after 15 minutes.
- If it is unclear whether the person is hypoglycaemic or hyperglycaemic, the first aid provider should provide care for hypoglycaemia.
- If the person has specific medication, support them in self-administering.

Chain of survival behaviours

Prevent and prepare

- People who are diabetic should be encouraged to carry blood testing kits with them, as well as insulin or other oral medication or sugary food.
- People who are diabetic should be advised to alert their family and friends to their condition and inform them on how to respond in an emergency.

Early recognition

Talk to the person. They may be able to tell you they are having a diabetic emergency and how you can help them. You can also look for medical alert jewellery on the person.

Someone with low blood sugar may show signs of:

- sweating with cold, clammy skin
- weakness, faintness or hunger
- drowsiness, restlessness, aggressiveness (often resembling drunkenness)
- headache
- rapid pulse
- muscle tremors
- deteriorating level of response and leading eventually to seizures or unresponsiveness.

First aid steps

1. Help the person into a comfortable position, either sitting or lying down.
2. If the person has their own glucose or another sugar source, help them to take 15-20 grams of it. If they do not, give them a sugary (non-diet) drink, such as fruit juice, or some sugar (such as three teaspoons of sugar or three pieces of candy, like jellybeans).
3. If symptoms continue after 15 minutes, give the person a repeated amount of glucose or sugar substance.

CAUTION

- Only give the person something to eat or drink if they are responsive and able to swallow.

Access help

If the person's condition does not improve quickly (around 30 minutes) or they become unresponsive, access emergency medical services (EMS). Monitor the person's level of responsiveness, breathing and circulation while waiting for help to arrive. Advise the person to seek medical help if their symptoms are occurring more frequently than usual or if they have a fever.

Recovery

If the person starts to feel better, advise them they can eat some slow-acting sugars (e.g. a slice of bread or a waffle). Encourage them or their companion to measure their blood sugar level.

Education considerations

Learner considerations

- Learners may have some misunderstandings, or pre-existing notions, of those impacted by diabetes (such as only overweight people get diabetes, it only affects middle-aged men, or it is a rich person's disease). Ensure learners know that diabetes, and therefore diabetic emergencies, can affect anyone.
- Introducing the terms hyperglycaemia and hypoglycaemia may be important for some learners; however, you may consider keeping language to "high blood sugar" or "low blood sugar", particularly for children.

Facilitation tips and tools

- Explore different ways in which learners can help the people with whom they live or work, who may have diabetes, recognize the signs of a diabetic emergency (e.g. videos and pictures).
- Even in an emergency, the ill person might be able to tell you what to do, so encourage learners to listen to them and act accordingly.
- Emphasize the importance of recognizing low blood sugar as it requires immediate care. If the brain is deprived of sugar, this can lead to Seizures and possible brain damage.
- Emphasize that giving sugar to someone who has high blood sugar is unlikely to harm them. Not giving someone sugar who urgently needs it, however, can be much more harmful.
- Emphasize that diet food and drinks do not contain any sugar and will not raise the sugar levels of someone having a diabetic emergency.
- Encourage learners to share their experiences with diabetic emergencies, for example, if they have a family member who has experienced a diabetic emergency. Sharing experiences can help people gain confidence and act effectively if the same thing happens again.

Learning connections

- If the person becomes unresponsive, open their airway and check for breathing.
- If the person has a seizure, protect them from injury.
- Diabetes can damage blood vessels and cause other serious conditions such as a heart attack or stroke.

Scientific foundation

The International Liaison Committee on Resuscitation (ILCOR) conducted two systematic reviews on hypoglycaemia.

Dietary sugars versus glucose tablets

In 2021, ILCOR completed an evidence update to identify additional studies for their systematic review, published in 2017. The review compared providing dietary forms of sugar to a standard dose (15g to 20g) of glucose tablets to someone experiencing hypoglycaemia (Carlson et al., 2016). The evidence update was published in the 2021 Consensus on Science with Treatment Recommendations (CoSTR) publications but did not identify any new studies (Wyckoff et al., 2021; Wyckoff et al., 2022a). The current evidence base consists of four studies, all comparing glucose tablets with sucrose, fructose, orange juice, jellybeans, Mentos and milk (Carlson et al., 2016; Singletary et al., 2015; Zideman et al., 2015).

For the important outcome of clinical relief from hypoglycaemia in 15 minutes or less, three randomized controlled trials were included. Pooled data from 502 people with diabetes treated with dietary sugars (sucrose, fructose, orange juice, jellybeans, Mentos and milk) and 223 people treated with glucose tablets (15g to 20g) showed a benefit with glucose tablets. There was a slower resolution of symptoms 15 minutes after a person with diabetes was treated with dietary sugars compared with glucose tablets. Low-certainty evidence downgraded for risk of bias and imprecision.

There is one observational study on the important outcome of blood glucose (at least a 20-mg/dL increase in blood glucose by 20 minutes). In it, 13 people with diabetes were treated with dietary sugars and nine were treated with glucose tablets. It showed a benefit with glucose tablets. Fewer people demonstrated a 20-mg/dL increase in blood glucose level 20 minutes after treatment when treated with dietary sugars compared with glucose tablets. The evidence is of very low certainty and has been downgraded due to risk of bias and imprecision.

For the critical outcome of time to resolution of symptoms, the important outcome of risk of complications (e.g. aspiration), and the low-priority outcome of hospital length of stay, no human trials were found.

Based on the evidence, ILCOR recommends that first aid providers administer glucose tablets for treatment of symptomatic hypoglycaemia in responsive individuals, and suggests that various forms of dietary sugars, such as Skittles, Mentos, sugar cubes, jelly beans or orange juice, can be used (Wyckoff et al., 2021; Wyckoff et al., 2022a).

First aid glucose administration routes

In 2021, ILCOR performed an evidence update to identify additional studies for their Cochrane systematic review published in 2019 (De Buck et al., 2019). This evidence update, published in the 2022 CoSTR publications, did not identify any new studies (Wyckoff et al, 2022b; Wyckoff et al, 2022c), and the current evidence base consists of four studies (De Buck et al., 2019; Singletary et al., 2020a; Singletary et al., 2020b):

- One randomized study that compared sublingual glucose administration in the form of table sugar with an oral administration of 42 hypoglycaemic children between the ages of one to fifteen years old.
- Two non-randomized studies that compared buccal glucose administration with oral administration in 23 healthy, fasting adult volunteers.

- One randomized study that compared a dextrose gel with oral administration of glucose in 18 people with type one diabetes and hypoglycaemia.

Providing sugar under the tongue (sublingual) resulted in a more significant rise in blood glucose after 20 minutes than giving the sugar orally. However, this was in a specific setting and included children with hypoglycaemia and symptoms of malaria or respiratory tract infection. On the other hand, giving glucose using inner cheek absorption (buccal) resulted in a lower blood glucose concentration than giving it orally. For dextrose gel (where glucose is given through a combination of oral swallowing and cheek absorption), results showed no clear benefit compared to oral glucose administration (taking glucose tablets or glucose solutions). Most studies did not report on time to resolution of symptoms, resolution of hypoglycaemia as defined by blood glucose levels above a certain threshold, time to resolution of hypoglycaemia, adverse events or treatment delay.

The evidence is of very low certainty due to limitations in study design, few studies, the small number of participants in the studies and because half of the studies were performed with healthy volunteers rather than in people with characteristic hypoglycaemia.

Based on the evidence, ILCOR recommends the use of oral/swallowed glucose for adults and children with suspected hypoglycaemia who are responsive and able to swallow. If oral glucose (e.g. glucose tablet) is unavailable, ILCOR suggests administering a combined oral and buccal glucose (e.g. glucose gel). Also suggested is the use of sublingual glucose administration for suspected hypoglycaemia for children who may be uncooperative with the oral (swallowed) glucose administration route. Finally, ILCOR suggests against buccal glucose administration compared to oral/swallowed glucose administration (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

Seizure

Key action

Protect the person from harm.

Introduction

A seizure is caused by a disruption in the brain's electrical activity and can result in unresponsiveness, muscle twitching, loss of bodily control (e.g. bladder release, limb flailing) or blank staring. The severity varies from person to person, with some experiencing seizures of greater intensity. Several conditions can cause seizures, including a head injury, infection, poisoning or fever. A condition called epilepsy can also cause seizures and is usually treated with medication. Babies and young children are particularly prone to seizures if they experience a sudden increase in body temperature (febrile seizures). While a seizure is usually not harmful and passes after a short time, it may cause the person to injure themselves further (e.g. hit their head on the ground if they collapse).

Guidelines

- First aid providers should not force anything into the person's mouth.**

Good practice points

- The person experiencing a seizure may be placed on the floor to prevent injury from falling.
- Once the seizure has ended, first aid providers should check the person's breathing and treat them accordingly.

Chain of survival behaviours

Prevent and prepare

- Those who look after a person prone to seizures should learn to recognize what regular seizure activity looks like for that individual, as well as their prescribed treatment and first aid action plan. If the seizure activity is abnormal or the recommended intervention is ineffective, the caregiver should access help immediately.
- Schoolteachers and other caregivers should be trained in first aid learning (where appropriate) to build their confidence and comfort in emergencies (Berhe et al., 2017; Kaleyias et al., 2005).
- Raise awareness among caregivers that a fever can cause seizures in babies and children. Prevention includes treating the fever and dressing babies and children appropriately for their environment.
- In contexts where malaria is prevalent, one of the most common causes of seizures in children is a fever caused by malaria. Therefore, malaria prevention (e.g. insecticide-treated mosquito nets or mosquito repellents) may be effective at preventing episodes in settings where anti-epileptic treatment is unavailable (Ba-Diop et al., 2014).

Early recognition

People with epilepsy may experience a warning sign before an epileptic seizure, known as an "aura", causing them to feel strange or experience a particular taste or smell. Other than epilepsy, a seizure may also be the result of a head injury, disease, infection, poisoning or fever (especially in babies and children). Conversely, there may be no apparent reason for the seizure.

Seizures may look different from one individual to the next.

Signs of a seizure include:

- sudden loss of responsiveness
- sudden collapse
- involuntary muscle movements such as twitching, jerky movements, stiffness, arching of the back and a clenched jaw
- noisy, difficult breathing
- saliva foaming around the mouth
- incontinence.

Following the active stage of a seizure the person may:

- fall into a deep sleep
- start to breathe normally or deeply
- become responsive again, often after a few minutes
- be unaware of what has happened.

Someone who experiences an absence seizure may:

- have a blank stare
- have mild twitching
- be unaware of their surroundings.

First aid steps

1. For those in active seizure, protect the person from harm by moving any nearby objects that may hurt them. Avoid moving the person unless they are in immediate danger (e.g. they are in oncoming traffic).
2. Place soft padding (e.g. a cushion or sweater) under the person's head to protect it. Remove eyeglasses and loosen any restrictive clothing around their neck. Do not restrain the person.
3. Access emergency medical services (EMS) in any of the following cases:
    a. the person has hurt themselves
    b. it is the person's first seizure
    c. the seizure lasts more than five consecutive minutes
    d. the person does not regain responsiveness after the seizure
    e. the person experiences repeated or different types of seizures than usual, or the seizures have increased in frequency
    f. the person is diabetic, pregnant or recently pregnant
    g. the person has a high fever
    h. the person is under the influence of alcohol or substances

    i. when in doubt.
4. Note the start and stop time of the seizure, as well as if it recurs. Communicate this information to EMS.
5. When the seizure is over, check the person's breathing and keep checking this regularly. Remove the padding from under their head if it may interfere with their breathing.
    a. If they are breathing normally, move them onto their side and ensure their airway is open.
    b. If they have abnormal breathing, see unresponsive with abnormal breathing.
6. If present, ask a family member or caregiver if the person has any anti-seizure medication. There are many ways this medication can be administered, including orally, a spray in the nose, an injection or rectally. Assist the caregiver if you feel comfortable doing so.

Babies and children

In addition to the steps above, check the baby or child's temperature. If they are too hot, cool them by removing any excess clothing and exposing them to fresh, cool air. Treat any fever if necessary.

- If the person is unresponsive, focus on maintaining an open airway.
- Do not force anything into the person's mouth.
- If you do not know the person, look for any medical information they may have on them, such as a medical bracelet with details of their condition, while accessing help.
- Protect the person's dignity. For example, move bystanders along or cover any signs of incontinence (accidental urination).
- Stay with the person until the seizure has passed and they are back to their normal baseline.
- Be aware that, once the seizure is over, a person may be confused or aggressive. Mind your own safety and avoid touching the person excessively.

Access help

- A person with epilepsy may wish to manage their condition independently and request that you do not access help. If they are with a companion (e.g. partner, parent or caregiver), listen and support what this person says as they are more familiar with the condition than you are. If the person having a seizure is alone, a medical bracelet or necklace may provide you and EMS with information.
- A seizure that lasts longer than five minutes is called "status epilepticus". It is a severe condition and requires immediate medical assistance. Access help right away.

Education considerations

Context considerations

- In schools or other environments involving children, educate peer groups and teachers on seizures and epilepsy to reduce the stigma surrounding these conditions. Ensure they know how to keep children with epilepsy safe and comfortable.
- Dispel misconceptions about seizures if they are prevalent among the learner audience:
    - Do not force items in the person's mouth.
    - Do not hide the signs and symptoms of a seizure.

    - Some cultures may associate spiritual aspects with seizures. Facilitate a discussion and emphasize that a seizure is a medical condition that requires appropriate care.

Learner considerations

- New parents or caregivers may benefit from learning about seizures in babies and children.

Facilitation tips and tools

- Address any misconceptions about epilepsy and seizures to reduce stigma and prejudice. Conduct activities that incorporate accurate information about the causes of epilepsy and seizures.
- Focus on building learners' confidence to help someone having a seizure.
- Facilitate a discussion to understand what learners already know about seizures and build on this knowledge. Be aware that there is a difference between knowledge, understanding and confidence to act.
- Discuss learners' experiences with seizures and address any barriers to providing care.
- Acknowledge common mistakes when caring for a person experiencing a seizure, such as trying to:
    - open the person's mouth
    - put something in the person's mouth
    - restrain the person.
- Explain that these actions may injure the person and that it is best to let the seizure run its course.
- Acknowledge that it can be frightening to see someone having a seizure for the first time, but reassure them that there are simple things learners can do to protect the person from harm.
- Create scenarios to allow learners to explore some of the social considerations relevant to seizures, such as bystanders watching, the person passing urine while having a seizure, bystanders insisting on incorrect help like CPR and concerns about helping or touching another gender in public.
- Use group discussion to explore how people describe seizures. If appropriate, use video sensitively to support learners' ability to identify the signs and symptoms of seizures.

Learning connections

- Seizures in babies and children are often caused by fever.
- After the active stage of a seizure, the person will usually be unresponsive and breathing normally.
- Make a connection to providing emotional support to the person having a seizure. The first aid provider should provide reassurance and comfort by letting the person know they are there and will not leave them alone.
- Make a connection to managing the scene. For example, bystanders may gather to see what is happening. This can be embarrassing for the person having a seizure. The first aid provider should protect the dignity of the person and request any bystanders to clear the area.

Scientific foundation

Systematic review

In 2020, the Centre for Evidence-based Practice (CEBAP) conducted two evidence summaries: one on how to position someone having a seizure and one on putting an object in the mouth of a person having an epileptic episode.

Regarding putting an object in the mouth, the summary contains two observational studies in favour of not forcing an object between the teeth during seizure episodes. It was shown that forcing an object between the teeth resulted in a statistically significant increase in orofacial injuries, compared to not forcing an object in the mouth. The evidence is of very low certainty and results cannot be considered precise due to limited sample size and low number of events. The evidence was declared stable and this summary was not further updated.

The summary concerning a certain posture was updated in 2024, but no studies were identified.

Non-systematic reviews

The International Liaison Committee on Resuscitation (ILCOR) did a scoping review on the positioning of people with medically induced altered levels of responsiveness not requiring CPR. There were no definitive guidelines from that comprehensive review (Douma et al., 2020).

Education review

We considered 20 papers from an educational lens and chose two for their insights into learning, specifically from the perspective of schoolteachers (Berhe et al., 2017; Kaleyias et al., 2005). Findings from these two papers also represented those from other studies.

The most relevant finding was that knowledge, skills and attitude gaps regarding epilepsy still exist in educational professionals, many of whom may be required to support a student with epilepsy in their class in addition to educating other students on the condition. Additionally, the papers identified some critical misconceptions that could affect the quality of care someone with epilepsy might receive. Some teachers were unclear about what epilepsy is and how it can affect a person. Some thought it might be contagious, while others believed it caused problems in school, or that it meant students with epilepsy were less intelligent than others. Many teachers did not know or feel confident to give first aid to someone having a seizure and were afraid of it happening in their classroom. Conclusions from both papers highlighted the need for increased awareness of the condition and causes of epilepsy, with an emphasis on myth-busting and first aid, to support the person having a seizure.

We also reviewed another paper (Ba-Diop et al., 2014), with insight into this topic specific to sub-Saharan Africa. It highlighted the significantly higher prevalence of epilepsy in sub-Saharan Africa compared to Asia, Europe and North America and the stigma attached to the condition in this region. It also noted the fact that nearly 60% of people with epilepsy do not receive anti-epileptic treatment, mainly for social and economic reasons.

Feeling faint

Key action

Help the person get into a safe and comfortable position and ask them to do physical counterpressure manoeuvres to increase blood flow to their brain.

Introduction

Fainting is a temporary loss of responsiveness due to a fall in blood supply to the brain. More often, the person does not become completely unresponsive and usually becomes fully responsive immediately after. Usually, a person will experience a short period of feeling faint before they faint. This is the ideal time to provide first aid, before the person collapses. Feeling faint and fainting are common occurrences and may happen as a response to a variety of conditions, including pre-existing chronic issues, stress, pain, hunger or exhaustion. It can also occur if a person stands still for a long time, especially in warm temperatures.

Guidelines

- First aid providers should assist the person who is feeling faint in doing physical counterpressure manoeuvres.**
- While in a safe and comfortable position, a person feeling faint can perform counterpressure manoeuvres on their own to lessen the feeling.*
- Lower-body physical counterpressure manoeuvres (such as leg crossing and tensing, or squatting), rather than upper-body and abdominal physical counterpressure manoeuvres, should be used to lessen the faint feeling.*

Good practice points

- A person who is feeling faint should be helped into a safe and comfortable position, such as sitting or lying on the floor, so they cannot fall.
- For a person who is feeling faint accompanied by chest pain or palpitations, contact emergency medical services.
- If counterpressure manoeuvres are not possible, the first aid provider may ask the person to lie down and raise the person's legs (30-60 degrees), which may increase blood flow to the person's brain and may improve the person's condition.
- If the person faints, it should be brief with almost immediate recovery. If the person becomes unresponsive, the first aid provider should immediately check their breathing. See Unresponsiveness.
- The first aid provider should speak to the person to find out why they may feel faint (e.g. low blood sugar or fatigue) and address their needs (once they have recovered from feeling faint).
- Water may be offered to the person if they are responsive and able to swallow.

Chain of survival behaviours

Prevent and prepare

- Take precautions to avoid the conditions that may cause a person to feel faint. Ensure people have enough to eat and drink, get enough rest and avoid standing for long periods.
- Stay hydrated.
- Maintain a normal temperature.

Early recognition

The person may have just experienced something shocking or painful. They may be hungry, tired or have been standing for a long time.

Suddenly the person may become pale or ashen. They may tell you that they feel faint.

First aid steps

1. Help the person to sit or lie down in a safe and comfortable position, where they cannot fall.
2. Ask the person to do physical counterpressure manoeuvres to improve blood flow to their brain. Alternatively, you could offer to raise their legs for them if they lie down.
3. Reassure the person and observe them closely for changes in their level of response or breathing. If possible, try to establish why they feel faint and whether there is anything further you can do to help them.

CAUTION

- A person who recovers from feeling faint should resume their activity only gradually as they may feel faint again.
- If the person faints and falls, be alert to the potential injury they may sustain. See Head injury or fractures, sprains and strains.
- A person who faints should become responsive again very quickly. If the person is unresponsive, check their breathing and provide first aid accordingly. See Unresponsiveness.

PHYSICAL COUNTERPRESSURE MANOEUVRES

Lower-body counterpressure manoeuvres may be more effective than upper-body manoeuvres. Physical counterpressure manoeuvres include:

Squatting

- Advise the person to squat.

Leg tensing

- Advise the person to cross their legs and tense the leg, abdominal and buttock muscles. The person can also try raising their legs if seated or lying down.

Arm tensing

- Advise the person to tense and release their arm muscles by gripping one hand with the other and pulling their arms in opposite directions. If squatting or leg exercises are not possible, arm tensing can be used as an alternative.

Access help

- Feeling faint and fainting does not usually require medical care.
- If the person does not become responsive immediately after fainting, they may be experiencing something more severe (e.g. a heart attack). Access help immediately.
- In a public place, you could ask bystanders to help you protect the person's dignity, for example, by blocking the view of people passing by.

Recovery

- The person should get some fresh air.
- After the first episode, the person should try to recognize the signs of fainting as early as possible. In that way, in the future, they can quickly get into a comfortable and safe position and consider using counterpressure manoeuvres.

Education considerations

Context considerations

- Feeling faint is a common occurrence, especially in warm temperatures or areas with limited fresh air. Ask learners for examples of when they felt faint. What was the temperature? Were they hungry? Tired? Stressed?

Learner considerations

- Individuals who regularly interact with pregnant people should learn how to support and lie the person on the left side if they are feeling faint.

Facilitation tips

- Brainstorm situations where someone might feel faint. For example, when facilitating a group of teachers, their students may be at a greater risk of fainting if they engage in physical activity or stand for a long period on a hot day.
- Emphasize the difference between someone feeling faint or becoming unresponsive and breathing normally. Someone who is feeling faint (or faints) should be able to tell you that they feel faint. If they cannot do this, then they should be treated as unresponsive.
- Encourage learners to consider what might happen to someone who faints and how they can respond. For example, what should they do if the person faints and hits their head on a hard surface?
- The science behind fainting could be explained to learners by putting a little bit of soy sauce in a clear bottle of water. The soy sauce will sink to the bottom. Explain this is what happens in the body - the blood goes down toward the feet. Then lie the bottle down and then raise the bottom of the bottle and the soy sauce will start to flow up to the “head” of the bottle. Explain this is also what happens in the body - that sitting or lying down and using counterpressure movements helps the blood to move up the body again to the brain.

Learning connections

- Feeling faint may be caused by a health condition to which first aid providers should be alert, such as diabetic emergency, heart attack, stroke, head injury, dehydration, hyperthermia or poisoning.
- Fainting can lead to unresponsiveness. Connect this topic to unresponsive and abnormal breathing and unresponsive and breathing normally.

Scientific foundation

Systematic reviews

A systematic review was carried out by the International Liaison Committee on Resuscitation (ILCOR) (Jensen et al., 2020; Soar et al., 2019a; Soar et al., 2019b; Singletary et al., 2020a; Singletary et al., 2020b). Two randomized controlled trials and six prospective cohort studies were included in the analysis regarding the use of physical counterpressure manoeuvres compared with no manoeuvres in adults and children with signs and symptoms of faintness or presyncope of suspected vasovagal or orthostatic origin.

For the prevention of fainting, one randomized controlled trial demonstrated benefit with the use of handgrip physical counterpressure manoeuvres, while the observational studies failed to show the benefit of handgrip and arm-tensing manoeuvres. Two randomized controlled trials showed benefit in symptom improvement when using handgrip manoeuvres. One observational follow-up study found symptom improvement in association with the use of squatting and abdominal tensing. One randomized controlled trial reported improvements in systolic blood pressure and heart rate using handgrip manoeuvres. Four observational studies did not report consistent changes in heart rate, and two pooled observational studies reported increased systolic and diastolic blood pressures when using lower-body manoeuvres. No adverse events were reported in any of the included studies. Overall, the level of certainty of the evidence was judged to be low or very low across all outcomes.

One observational study and one randomized controlled trial compared upper-body to lower-body physical counterpressure manoeuvres. In the observational study, benefit was found for the use of lower-body manoeuvres (lower body muscle tensing) compared with control or no use of counterpressure manoeuvres. The randomized controlled trial did not find greater improvement in symptoms of presyncope with the use of lower-body compared with upper-body manoeuvres.

In 2022, ILCOR conducted an evidence update for this review, but did not identify any new studies (Wyckoff et al., 2022b; Wyckoff et al., 2022c). An additional evidence update in 2024 resulted in one new unblinded randomized controlled trial, but the data were insufficient to warrant a full systematic review (Greif et al., 2024a; Greif et al., 2024b).

Fever

Key action

Assist the person to take paracetamol (also known as acetaminophen) to control their fever.

Introduction

When a person's body temperature is above 38°C (100.4°F), the person has a fever. Medical conditions, such as viral infections or sepsis, can cause a fever. A fever is a common and normal response to fight infection and, in most circumstances, is not harmful (El-Radhi, 2012). For more information on fevers due to environmental conditions, see Hyperthermia.

While fever can affect people of all ages, it is common in children. It rarely reaches 41°C (105.8°F). Many healthcare providers and parents view fever as a dangerous condition or a symptom to be stopped, despite evidence that fever is the body's natural method of fighting and overcoming acute infections (Green et al., 2021). Fever has the potential to cause a seizure in children because their bodies cannot yet regulate their temperature. First aid providers should consider the possible causes of a high temperature (e.g. infection or disease) and help the person access medical care if necessary.

Guidelines

- Paracetamol may be given to a person with a fever who is feeling unwell.*

Good practice points

- A cold cloth on the person's face may be used but sponging or placing the person in cool or cold water on them should be avoided. The cold water can cause the person to shiver, which will make them warmer, or cause their blood vessels to constrict and decrease blood flow to the skin and therefore decrease heat loss.
- People with a fever should rest and drink fluids to replace the fluid loss caused by sweating.
- People with fever should dress lightly and the first aid provider should avoid layering them with excessive blankets or coverings.
- Access emergency medical care if a person with a fever also has any of the following signs and symptoms:
    - a rash
    - a change in mental status
    - difficulty breathing
    - severe abdominal pain
    - sensitivity to light and vomiting
    - signs of Shock.
- A baby, child or adult should receive medical care as soon as possible if:
    - the baby with a fever is under three months of age
    - the child has a temperature higher than 39°C (102.5°F)

    - the person with fever is over 65 years of age
    - the person with fever has cancer, a weakened immune system, sickle cell disease or is taking medications which affect their immune system
    - the fever does not decrease with paracetamol or lasts more than three days
    - additional symptoms occur that are concerning.
- Depending on the local context (e.g. areas where malaria is present), people with fever should seek medical care, even if they have no other symptoms.
- A high fever may cause a child to experience a seizure. While the seizure could be an indication of a more serious infection, such as meningitis, it is often the result of an increase in temperature only. See Seizure.

Chain of survival behaviours

Prevent and prepare

- Know the causes of fever in children and take any available precautions, such as vaccinations or medication against particular illnesses in areas where there is a risk.

Early recognition

If possible, check the person's temperature. A fever above 39°C (102.5°F) can be harmful and may indicate a serious infection or disease. Consider this as you assess the person.

In the early stages of fever, the person may have a high temperature but tell you they feel cold, or they may be shivering or have chattering teeth or goose pimples.

The person may experience:

- a high temperature above 38°C (100.4°F)
- hot, flushed skin and sweating
- headache or other aches and pains
- loss of appetite
- fatigue.

First aid steps

1. Advise the person to rest and dress lightly.
2. Offer the person fluids to drink to replace lost fluids from sweating.
3. In many cases, medication is not necessary. If the person is feeling unwell, you can control their fever by giving them the recommended dose of paracetamol. You can also sponge the person with lukewarm water, as long as this does not upset them.
4. Monitor the person's condition and be aware of any additional signs and symptoms that occur.

CAUTION

- Do not overheat the person with layers of clothing or blankets.
- Do not use cold water to sponge the person, as this may cause them discomfort and may stop their body from releasing some heat.
- Paracetamol is preferred and safe, particularly when administered at recommended doses. Ibuprofen can cause gastrointestinal irritation and kidney damage and needs to be used with caution (Loya et al., 2022).

- Often, one antipyretic medication (e.g. paracetamol or ibuprofen) is effective. Combining or alternating antipyretics should only be done with careful coordination to ensure there is no double-dosing (Green et al., 2021).

Access help

Sometimes a fever can indicate a more serious condition. Access emergency medical services (EMS) immediately if the person has a fever combined with any of the following:

- a rash, especially if the spots are raised or firm (palpable) or the rash does not blanch when you push on it
- a change in mental status
- difficulty breathing
- severe abdominal pain
- sensitivity to light and vomiting
- signs of shock.

Access medical care if:

- a baby with a fever is under three months of age
- a child has a temperature higher than 39°C (102.5°F)
- the person with fever is over 65 years of age
- the person with fever has cancer, a weakened immune system, sickle cell disease or is taking medications which affect their immune system
- the fever does not decrease with paracetamol or lasts more than three days
- additional symptoms occur that are concerning.

Education considerations

Context considerations

- Educate parents and caregivers on the benefits of fever and how to recognize and care for additional signs and symptoms. Focus on assessing the person's condition, rather than just their fever (Green et al., 2021).
- Emphasize that when caring for an otherwise healthy child with a fever, the first aid provider should assess for the cause of the fever and focus on keeping the child calm and comfortable, rather than trying to treat the temperature. First aid providers should make sure the social and physical environment is optimal before considering the use of antipyretic medications (paracetamol or ibuprofen) (Green et al., 2021).
- The recommendation of antipyretics for a fever depends on local laws, regulations and processes, including liability protection. Depending on the national context, educators may need to adapt their programme accordingly.
- Many endemic illnesses cause fever (e.g. malaria). Consider the endemic illnesses in your local or regional area and draw on these to help learners understand how fever works and how best to manage it.
- If a person has a small fever without any discomfort, it may not be necessary to give them paracetamol.

Facilitation tips

- Misconceptions and unfounded fears about fever persist among caregivers of children. In some cases, this fear can lead to aggressive and dangerous practices, including overdosing with antipyretics and sponge bathing with alcohol (Clarke, 2014). Take time to explore and dispel myths and misconceptions with learners.
- Since fever can indicate a more serious illness or trigger a seizure, learners need to understand their role in looking out for signs that indicate the need to access medical care.
- Include education that addresses managing a person's fever, even if they say they feel cold. Ask learners to reflect on their experience with having a fever and feeling chilled at the same time—how did their body react? For example, were they sweating and shivering at the same time? What did they need to feel better? Caution that while the goal is to bring the person's temperature back down, this needs to happen gradually. Highlight the importance of monitoring the person's temperature to ensure they do not become too cold (e.g. by removing too many layers or sponging with cold water).
- Discuss clothing in the context of your country and climate. What clothing or layers will make the person most comfortable and not cause them to overheat or feel cold?
- Consider which fluids will best keep the person hydrated and cool (e.g. a baby should have their breast or bottle milk while an adult will benefit more from cool water).

Facilitation tools

- Set out containers with water at different temperatures. Ask learners to test the different samples and see if they can determine what lukewarm water feels like. If you are short on time, provide a sample of lukewarm water and allow learners to familiarize themselves with the water's temperature.

Learning connections

- Fever in children is often caused by an infection or disease. Explore connections to topics such as earache, meningitis or any endemic diseases that result in fever.
- Fever in young children can result in a seizure as their bodies are not yet able to regulate temperature properly.

Scientific foundation

The Centre for Evidence-Based Practice (CEBaP) conducted two evidence summaries for this topic: one on the use of paracetamol and another on the use of physical methods (with or without paracetamol) to reduce fever. The evidence summary about the use of paracetamol had been declared stable and was not updated further. The other summary was updated in 2024, but did not identify any new studies.

Systematic reviews

Paracetamol versus placebo

There is limited evidence from one Cochrane systematic review in favour of paracetamol compared to placebo for treating fever in children. The review showed that paracetamol resulted in a statistically significant increase in fever relief at the second hour, compared to placebo or

physical interventions (such as tepid cooling). However, this relief could not be demonstrated in the first hour. A statistically significant difference in adverse events was not demonstrated between paracetamol and placebo or physical methods. The evidence is of low certainty and results cannot be considered precise due to the low number of events and large variability of results.

Physical methods versus placebo

Physical methods to decrease fever can include tepid sponging, bathing, fanning and cooling blankets.

There is limited evidence from two experimental studies, extracted from one Cochrane systematic review, neither of which favours sponging or placebo. The first study, comparing tepid water sponging to a placebo, could not demonstrate a statistically significant increase in fever resolution within one hour. The second study demonstrated that tepid water sponging led to a statistically significant increase in fever resolution within two hours, compared to the placebo. The evidence is of low certainty and the results of these studies are imprecise due to limited sample size and large variability of results.

Physical methods combined with antipyretics versus antipyretics

There is limited evidence from one systematic review in favour of antipyretics only. In making this conclusion, we place a higher value on adverse effects.

Regarding effectiveness, it was shown that using physical methods in combination with antipyretics resulted in a statistically significant increase in fever resolution after one hour, compared to antipyretics alone. A statistically significant increase in fever resolution after two hours, using physical methods combined with antipyretics, compared to antipyretics alone, could not be demonstrated. In addition, a statistically significant increase in children with a temperature fall of 1.5°C by one hour or by two hours, using sponging with tepid water combined with paracetamol compared to paracetamol only, could not be demonstrated. Additionally, a statistically significant decrease in temperature after 30 minutes, using tepid massage combined with antipyretics, compared to antipyretics alone, could not be demonstrated. It was shown that using antipyretics only resulted in a statistically significant decrease in temperature after 120 minutes, compared to using tepid massage combined with antipyretics. However, in another study, a statistically significant decrease in temperature after 120 minutes, using tepid massage combined with antipyretics compared to antipyretics alone, could not be demonstrated.

Regarding the adverse events, it was demonstrated that sponging with tepid water, combined with antipyretics, resulted in a statistically significant increase in adverse events compared to antipyretics alone. It was also shown that alcohol combined with paracetamol or ice water combined with paracetamol resulted in a statistically significant increase in the number of children with a poor comfort score. The evidence is of low certainty and the results are considered imprecise due to limited sample size and large variability of results.

Paracetamol is traditionally regarded as an effective treatment for managing fever in children. Paracetamol is effective in reducing fever, albeit with a slightly slower onset of action compared to ibuprofen. Caregivers may prefer paracetamol due to its perceived safety profile, especially

when concerns arise about potential side effects or contraindications associated with ibuprofen use (Alqudah et al., 2025; George et al., 2012).

Abdominal pain

Key action

Reassure the person and make them comfortable.

Introduction

Abdominal pain is a broad term referring to pain felt anywhere in the belly, specifically in the soft tissues located below the lungs and above the pelvis. A variety of conditions, such as gas, constipation, overeating, menstrual pain or an infectious stomach illness can cause acute abdominal pain. Occasionally, abdominal pain is the result of a more serious disorder affecting the organs in the abdomen, like kidney stones, an inflamed appendix or an inflamed gallbladder.

Guidelines

- In case of stomach or abdominal pain, the person should remain in a position most comfortable for them. Sitting or lying on the right side may improve gastric emptying.*
- A hot water bottle or heated wheat bag held against the lower abdomen or an abdominal massage may relieve menstrual pain.** This can be done with or without the use of essential oils (aromatherapy).*

Good practice points

- The first aid provider should reassure the person and help them to be more comfortable.
- In case of pain after eating a meal, it may help to keep moving (e.g. walking or running at a moderate pace) instead of lying down or staying seated. If a person with pain after a meal decides to lie down, it may help to have them lie on their right side.
- Upper abdominal pain and/or nausea may be symptoms of a heart attack.
- If the person has heartburn (acid-induced pain in the upper abdomen), it may help to lie down on their back with their upper body raised.
- Emergency medical services (EMS) should be accessed if the person:
    - vomits blood
    - has chest pain or risk factors/concerns for heart attack
    - was involved in an accident/trauma
    - has severe abdominal pain
    - shows signs and symptoms of shock
    - has blood with bowel movements (this can appear as black, tarry bowel movements or red blood)
    - experiences high fever (higher than 40°C for babies, children and older people)
    - is bleeding while pregnant
    - has an altered level of responsiveness.

- First aid providers should help the person access medical care if:

    - the pain does not subside

    - the abdomen is tender
    - abdominal pain is accompanied by severe diarrhoea and repeated vomiting, which can lead to dehydration, especially in older people or young children
    - the person has a fever (higher than 38°C).
- Paracetamol may be effective in relieving mild menstrual pain. Non-steroidal anti-inflammatory drugs (ibuprofen, diclofenac, naproxen, etc.) may also be effective; however, they may have side effects (e.g. upset stomach or conflict with other medications). The person may take these painkillers with fixed regularity on the days with pain according to the recommended dose and time interval. Aside from menstrual pain, the person should not take ibuprofen, painkillers or laxatives for abdominal pain. If menstrual pain disrupts daily life every month, the symptoms progressively worsen, the medication is not as effective as usual, or severe pain starts after age 25, the person should seek medical advice.
- To prevent infectious gastrointestinal illness, personal (and group) hygiene should be practised.

Chain of survival behaviours

Prevent and prepare

- Keep hydrated.
- Practise food hygiene.
- Practise hand hygiene.
- Avoid contaminated or rotten food.
- Take part in regular physical activity.

Early recognition

Abdominal pain is identified by pain in the abdomen. To help decide if the abdominal pain is an emergency and determine the first aid that will be most effective, establish what type of pain it is by asking questions such as:

- Is the pain sudden (new) or more severe?
- What does the pain feel like?
- Was this a result of trauma?
- Are there concerns for a heart attack?
- How long have you had the pain?
- What do you think may be causing the pain?
- Do you have gas or feel constipated?
- Are you having or expecting your period?
- What have you eaten recently and how much?
- Are you experiencing any other symptoms? If so, what are they?

Common types of abdominal pain

- Menstrual pain: throbbing or cramping pains in the lower abdomen.
- Gas: pain that sometimes moves throughout the abdomen, bloating or cramping.
- Infectious gastroenteritis: (sometimes intense) pain accompanied by nausea, bloating and vomiting.

- Inflamed appendix: abdominal pain that often begins around the belly button area and moves to the right lower part of the abdomen, progressively getting worse.

First aid steps

1. Reassure the person and help make them comfortable.
2. Access EMS if the person:
    a. vomits blood
    b. has chest pain or risks/concerns for cardiac pain
    c. was involved in an accident/trauma
    d. has severe abdominal pain
    e. shows signs and symptoms of shock
    f. has blood with bowel movements (this can appear as black, tarry bowel movements or red blood)
    g. experiences high fever (higher than 40°C for babies, children and older people)
    h. is bleeding while pregnant
    i. has an altered level of responsiveness.
3. In the case of menstrual pain, give the person a hot-water bottle or a heated wheat bag to hold against their abdomen.

- If the abdominal pain is accompanied by vomiting or diarrhoea, ensure the person keeps hydrated by drinking small sips of water regularly.
- If the pain is menstrual pain, help the person take the recommended dose of painkiller.
- If the person is experiencing pain following a meal, advise them to keep moving instead of lying down or staying seated. If the person needs to lie down, advise them to lie on their right side.

Access help

- Sudden, severe abdominal pain can occasionally indicate a more serious disorder, such as appendicitis or kidney stones. It may be a sign of a surgical emergency, so it is important to access medical care or EMS.
- Medical care should also be accessed if the pain does not subside, the person has a fever (higher than 38°C), or if the abdominal pain is accompanied by severe diarrhoea and repeated vomiting, which can lead to dehydration. Dehydration is common in older people and young children.
- In older people and females, upper abdominal pain could indicate a heart attack and may need to be seen by a medical professional. See chest pain.

Recovery

- Drink water regularly to stay hydrated.
- If taking a painkiller for menstrual pain, the person should take it on the days with pain with fixed regularity according to the recommended dose and time interval. Taking a painkiller before the pain has developed reduces overall discomfort.

Education considerations

Context considerations

- In contexts with limited resources, emphasize that most situations do not need much equipment (if any). Having the person rest with their feet raised and placing a heat pack on the abdomen will help to relieve the pain.
- Research the local regulations on who can administer painkillers and ensure the education follows those regulations.

Facilitation tips

- Consider teaching this topic to school nurses, parents, teachers and camp counselors.
- Adapt this topic to the most common conditions relevant to the learner.
- Incorporate prevention education around food hygiene and handwashing.
- Explore different causes of abdominal pain and focus on which instances are considered an emergency and when medical care is required.
- Draw on learners' own experiences of abdominal pain, including pain caused by anxiety, to contextualize their learning.

Learning connections

- Make links to other topics such as Dehydration, vomiting and diarrhoea and ensure learners understand any relevant human functions such as indigestion.

Scientific foundation

The Centre for Evidence-Based Practice (CEBaP) updated several evidence summaries in 2024.

Posture

A total of 12 studies, including two new ones identified in the updated evidence summary, examine specific postures immediately after having a meal. There is limited evidence in favour of semi-sitting at an angle of 45° (e.g. in a lounger chair) or sitting and standing after having a meal. Sitting, semi-sitting or alternating between sitting and standing resulted in a statistically significant improvement in gastric emptying, compared to lying on the back, a left lateral position or a head-down tilted position.

A statistically significant decrease in food retention and a decreased number of reflux episodes when lying down with the head and upper body slightly raised or in a head-down tilted position, compared to lying flat on the back, could not be demonstrated.

When comparing different side-lying positions, it was shown that the right side position resulted in a statistically significant decrease in gastric volume and a faster gastric emptying time, compared to the left side position. All evidence is of low certainty and results cannot be considered precise due to limited sample size and lack of data.

Physical activity

Six experimental studies were included in an evidence summary concerning physical activity after having a meal. There is limited evidence in favour of being active (walking or running at a moderate pace) after having a meal. It was shown that walking resulted in a statistically

significant faster gastric emptying time and reduced reflux in people with gastroesophageal reflux disease, compared to not walking. It was also shown that running at a moderate pace resulted in increased gastric emptying compared to sitting. A statistically significant decrease in reflux in healthy volunteers could not be demonstrated. Additionally, no statistically significant difference in gastric emptying was demonstrated after postprandial cycling at moderate intensity compared to resting. Evidence is of low certainty and results cannot be considered precise due to the limited sample size, lack of data and large variability in results.

Heat application for period pain

The 2024 evidence summary update on heat application for dysmenhorrhea (period pain) identified two new randomized controlled trials and one non-randomized controlled trial. Two randomized controlled trials had previously been identified. The trials demonstrated that placing a heat patch on the lower abdomen, compared to not using any heat (patch), resulted in statistically significant pain relief.

Massage for period pain

The 2024 evidence summary update on using massage for period pain added two new randomized controlled trials and two non-randomized controlled trials to the existing three studies in the evidence summary. It was shown that massage resulted in a statistically significant reduction of period pain. However, a statistically significant decrease in pain duration, severity of menstrual cramps, and abdominal and back pain could not be demonstrated. The evidence is of low certainty.

Two studies also measured the effect of aromatherapy massage, which resulted in a statistically significant decrease in period pain and cramps, compared to no massage. The evidence is of moderate certainty.

Additional information

Gastrointestinal distress is often caused by irritation or infection in the digestive system and can result in abdominal pain and vomiting. It is a common problem when travelling to tropical locations.

Sudden abdominal pain may be a sign of an inflamed appendix (appendicitis). It typically begins around the belly button area and progresses to the lower part of the abdomen, worsening over time. The person may also experience a low fever.

Certain viruses, such as the norovirus, can cause nausea, bloating and diarrhoea. Stomach conditions that cause vomiting or diarrhoea can lead to dehydration, especially in children and older adults. Gastroenteritis, a stomach illness that causes diarrhoea, nausea, vomiting and abdominal pain, is one of the most commonly documented. Individuals can also contract illnesses when participating in recreational water activities. This occurs when swimmers swallow water in which a stool has been released before chlorine or another disinfectant kills the infective organisms.

Pain in the abdomen usually has a minor cause, such as food poisoning. However, sometimes complaints about stomach pain may have nothing to do with the stomach itself—pain can come from another part of the body (e.g. upper belly pain may indicate a heart attack).

Abdominal pain can be a result of eating or drinking contaminated food or water. Hand hygiene is critical, as infections can pass directly from person to person through contaminated hands. Occasionally, abdominal pain is the result of a more serious disorder affecting the organs in the abdomen, like an inflamed appendix, gallbladder or kidney stone. Abdominal pain accounts for 5-10% of all emergency department presentations (Natesan et al., 2016).

Period pain (dysmenhorrhea) is a throbbing or cramping pain in the lower abdomen. Contractions in the uterus cause menstrual cramps. Every month, an egg is released from one of the two ovaries and the uterine lining becomes thicker so that a fertilized egg can settle in there. If pregnancy does not occur, the uterus contracts to release the mucous membrane, resulting in blood. There is no clear link between the amount of blood loss and pain.

Globally, the prevalence of period pain varies from 20-90% (Perissinotto et al., 2014). Many women have period pain just before and during their menstrual periods. Often, the pain is also felt in the back or legs and can be severe enough to negatively impact education, social activities and work. Approximately 60-80% of young women between the ages of 12 and 24 suffer (Marjoribanks et al., 2003; Nakame et al., 2018), while around 35% of female schoolchildren with dysmenhorrhea use it as a reason for failing school. Approximately 42% of working women are unable to work during their menstrual periods (Marjoribanks et al., 2003; Perissinotto et al., 2014).

Before or during menstruation, other symptoms can appear, such as headaches, painful breasts, bloating, nausea, diarrhoea, dizziness or fatigue. Sometimes women are also somewhat quicker to be sad or irritated before and during menstruation. However, menstrual cramps typically pass on their own.

Emergency childbirth

Key action

Support the person to give birth, providing comfort to both the person and baby.

Introduction

Childbirth is a natural process that usually takes several hours. This allows time to access the support of a midwife or to transport the person to a birthing facility. In some cases, an "emergency birth" takes place very quickly and not in the place where it was planned. Childbirth occurs naturally, and the first aid provider's role is to support the person through the process. There are three phases, starting with contractions and the person's water breaking, the second phase during which the person pushes the baby out, and the third phase when the person pushes the afterbirth out (including the placenta).

Guidelines

- Support the person to contact their chosen birthing partner(s), as their continuous support during labour contributes to a positive childbirth experience.**
- Being in an upright position (sitting, standing or walking) may help to shorten the duration of labour and the pushing phase. This may result in fewer assisted births, vaginal tears and incision of the perineum.*
- During labour, massage of the lower back may reduce pain intensity.*
- During labour, breathing exercises, yoga or listening to music may reduce pain intensity and improve the overall birthing experience.*
- During labour, heat application (e.g. warm compresses to the perineal area or lower back and sacrum area, a hot bath, the use of a hot water bottle on the lower back and abdomen, etc.) may reduce pain intensity. A warm perineal compress may also reduce vaginal tears.*
- Delayed cord clamping (≥60 seconds after birth) for term and late preterm infants born at or after 34 weeks' gestation who are vigorous or deemed not to require immediate resuscitation at birth may result in more favourable haemoglobin and haematocrit levels of the baby.*
- Skin-to-skin contact between the mother and the baby may improve breastfeeding and infant and maternal outcomes.*
- External uterine (self) massage in the immediate postpartum period may prevent postpartum haemorrhage.*

Good practice points

- The first aid provider should manage the scene to protect the dignity and safety of the person, as well as take care to comfort them and give emotional support.
- The person should be supported to move into the positions most comfortable, even if the amniotic sac is broken (waters have broken).
- The person may drink or eat something during labour if they want to.

- Hygiene measures should be taken where possible, such as wearing gloves and using clean cloths or towels, both under the mother and to wrap the newborn in.
- As soon as the baby is delivered, the first aid provider should check both the person and the baby for their responsiveness, breathing and for any bleeding.
- If the baby is responsive (e.g. crying) and breathing normally, there is no immediate need to cut the umbilical cord and the baby should be dried and kept warm to prevent hypothermia. Place the baby on the mother's chest and cover with a blanket.
- If the baby is unresponsive, the first aid provider should rub the baby dry and tap the soles of its feet. If the baby remains unresponsive and does not start breathing, CPR should be provided as soon as possible.
- If the presence of the umbilical cord makes this difficult, it should be cut. If possible, the umbilical cord should be tied twice (a hand's width apart) with a ribbon and cut in between the ribbons with the first ribbon about a hand-width from the belly of the baby.

Chain of survival behaviours

Prevent and prepare

- Know how to contact a locally available midwife or other community healthcare provider who can arrive quickly and provide support in an emergency.
- Encourage people expecting a baby to carry the contact phone numbers of their chosen birthing partners, as well as their preferred midwife or birth attendant.
- Recommend pregnant people remain close to support as they near the end of their pregnancy.

Early recognition

Talk to the person to try to determine whether they are starting labour (which may take several hours) or whether they are having an emergency birth.

The following signs indicate that labour has started, and the baby has entered the birth canal:

- painful contractions occurring at increasingly short intervals
- abdominal discomfort
- localized back pains
- the person's waters break
- sticky discharge.

In this instance, support the person in notifying their chosen birthing partner and preferred birth attendants, or in arranging transport to their chosen birth facility.

Childbirth might be imminent when:

- the contractions quickly become more intense and painful
- the contractions come in short intervals (one contraction every five minutes)
- the person's waters break.

If it becomes clear that the baby will arrive very soon or the person is in too much pain to travel, prepare to support the person through the emergency birth.

First aid steps

Initially, the first aid provider's key priority is the person in labour. Once the baby is born, the first aid provider has two people to care for: the person and the baby.

1. Access help (such as medical facilities, emergency medical services or a midwife) in line with the person's wishes and follow their instructions. Support the person to contact their chosen birthing partner.
2. In the first phase of childbirth, create a safe, comfortable, private and protected space for the person. Help them move into a position of comfort. This may be sitting, standing or moving around.
3. Offer to massage the lower back or offer relaxation methods such as yoga or listening to music as this may reduce pain and anxiety and improve the overall birthing experience.
4. If possible and if the person wants it, apply heat to the perineal, lower back, sacrum or abdomen. You can use a warm compress or hot water bottle, or offer a hot bath. The heat may reduce the pain intensity.
5. In the second phase of childbirth, help the person find a comfortable position, preferably an upright one. If lying on their back, put a small pillow under the right hip. In this way, you prevent the baby from pressing on important blood vessels.
6. If possible, wash your hands well with soap and water and place a clean cloth under the person where the baby will be born. When the person is ready to push, ensure they are in a supported position.
7. Watch the baby's head as it comes out and ensure it is supported. Newly born babies are slippery, so be very careful. Wipe any fluids or mucus away from the baby's mouth and nose.
8. Use a clean cloth to dry off the baby. Wrap the baby in a clean cloth and cover the baby's head to keep it warm. Keep the mother warm as well and place the baby on the mother's chest or abdomen as soon as possible.
9. In the third phase of childbirth, support the person as they deliver the afterbirth. Keep the afterbirth as a healthcare professional will need to check it is complete. Check to see if the mother is bleeding. Mild bleeding from the birth canal is normal. If bleeding is severe, help the person to lie down and keep them warm (see shock) until medical help arrives.

CAUTION

- Hygiene measures should be taken where possible, such as handwashing, wearing gloves and using clean cloths or towels, both under the person and to wrap the newborn baby in.
- Do not pull the baby's head and shoulders during delivery.
- Do not push on the person's stomach during labour or after delivery.
- If the umbilical cord is wrapped around the baby's neck during delivery, check that it is loose and carefully ease it over the baby's head to prevent the baby from strangulation.
- Do not pull on the umbilical cord. The afterbirth usually comes out by itself within about 30 minutes of the delivery.
- If the baby is responsive and breathing normally, there is no immediate need to cut the umbilical cord, which should be performed by a medical professional, if possible.

The person may drink or eat something during labour if they want to. This will help keep up their strength.

Unresponsive and abnormal breathing baby

- If the baby is quiet, open their airway and check for breathing. If the baby is breathing abnormally (gasping, taking irregular breaths or not breathing), place the baby on a firm surface and begin CPR as described in unresponsive and abnormal breathing (baby and child).
- If CPR is difficult because of the umbilical cord, cut the cord. To do this, if possible, tie a ribbon or string around the cord in two places, a hand's width apart, so blood can no longer flow through the cord. Then cut the cord in between the two ribbons.

Access help

- Emergency medical services (EMS) may be appropriate in many childbirth cases, or the person may have a preferred midwife or birth attendant. Consider contacting another local midwife or other community health worker if these are not available.
- Phone EMS, medical facilities or another healthcare provider, as they will be able to tell you what to do and support you.
- Tell EMS (or chosen healthcare provider) about any changes in the person's or baby's condition.

Education considerations

Context considerations

- Childbirth has very strong social and cultural references and expectations. Programme designers should adapt the learning to address local cultures and contexts.
- Highlight the importance of knowing what to do in an emergency childbirth situation in a remote environment.
- Programme developers should include content relevant to their region and country, and provide education on the actions a first aid provider is permitted to do.

Learner considerations

- Childbirth can be unpredictable, so parents-to-be in any context should consider learning this topic. Emphasis on the natural process of birth is important to reduce their anxiety.
- In remote areas where travel is difficult or there is no accessible maternity service nearby, the partner and family members of a pregnant person may also consider learning about this topic.
- In many countries, taxi drivers are a key learner audience for this topic.
- Learners who are more likely to do emergency childbirth in a vehicle could learn and practise childbirth in the vehicle. The mother could lie on the seat, with one foot on the floor and the other on the seat, with the knee and hip bent.
- Encourage community health workers and volunteers to understand this topic in the context of first aid, and to develop connections with their local clinical team.
- People with varying gender identities can give birth (e.g. a man with a uterus). Be sensitive to gender identities in discussing this topic according to the needs of the audience and respecting all opinions without making value judgements.

Facilitation tips and tools

- Emphasize accessing medical help as soon as possible and supporting the person through the childbirth process.
- Help learners understand the three phases of childbirth. Using pictures or diagrams can be helpful.
    a. Contractions and water breaking.
    b. The birth itself.
    c. The expulsion of the afterbirth (placenta and umbilical cord).
- A person who goes into childbirth unexpectedly might be very anxious. Allow learners to practise reassuring the person, making them comfortable and helping them to breathe. Reassure learners by emphasizing that during this time, if it is possible, they should be following the instructions of EMS (or another healthcare provider).
- A unique aspect of this first aid topic is the changing focus for the first aid provider, who initially needs to focus on the person and their well-being, but then needs to care for two people once the baby is born. Priority must be given to the person until the baby is born.
- Use different learning materials and styles, including discussions and storytelling, to develop confidence in learners. Encourage those who have experienced childbirth (even if not as an emergency) to share their experiences with those who have not experienced it.
- If possible and appropriate, invite a midwife to the education session to talk to learners and answer their questions.

Learning connections

- A newborn baby may be or become unresponsive with abnormal breathing.
- A person may experience severe bleeding during childbirth, and this may develop into Shock.
- Emphasize hand hygiene.

Scientific foundation

Systematic reviews

No scientific evidence is available which addresses specific issues of emergency birth, so the Centre for Evidence-Based Practice (CEBaP) extrapolated from “normal” deliveries. The International Liaison Committee on Resuscitation (ILCOR) conducted a systematic review on the timing of cutting the cord (Gomersall et al., 2021; Wyckoff et al., 2021; Wyckoff et al., 2022a) and on uterine massage in the immediate postpartum period (Djärv et al., 2025a; Djärv et al., 2025b).

Birth companion

There is evidence from one Cochrane systematic review including 26 clinical trials in favour of continuous support by a chosen birth companion. In making this evidence conclusion, a higher value was placed on subjective rating or feelings about the birth experience over the other outcomes.

It was demonstrated that continuous support from a chosen birth companion led to a statistically significant decrease in the occurrence of negative ratings or feelings about the birth experience, compared to standard care.

In contrast, it was shown that continuous support by a chosen birth companion did not result in a statistically significant difference in the use of any analgesia or anaesthesia, synthetic oxytocin and the occurrence of spontaneous vaginal birth, compared to standard care.

Furthermore, a statistically significant decrease in caesarean birth or admission to special care nursery, using continuous support by a chosen birth companion compared to standard care, could not be demonstrated. Evidence is of moderate certainty and results cannot be considered precise due to the large variability of results and the low number of events.

This evidence summary was considered stable and was therefore not updated.

Massage during delivery

There is low-certainty evidence from two systematic reviews in favour of massage (of the lower back).

- It was shown that massage resulted in a statistically significant reduction in pain intensity in the first stage of labour, compared to usual care. However, a statistically significant difference could not be demonstrated for pain intensity in the second and third stage of labour, or the use of pain relief.
- It was shown that massage resulted in a statistically significant reduced anxiety in the first phase of labour, compared to usual care. However, a statistically significant difference could not be demonstrated for anxiety in the second and third stages of labour.
- It was shown that massage resulted in a statistically significant reduced risk of resuscitation of the newborn, compared to usual care. However, a statistically significant difference could not be demonstrated for admission to a neonatal intensive care unit.
- It was shown that massage resulted in a statistically significant reduced risk of perineal trauma, compared to usual care. However, a statistically significant difference could not be demonstrated for postpartum haemorrhage.

Relaxation (breathing exercises, yoga, music)

There is limited evidence from four systematic reviews in favour of breathing exercises, yoga or music.

One systematic review provided moderate certainty evidence in favour of breathing exercises during labour. It was shown that breathing exercises resulted in a statistically significant decrease in the duration of the second stage of labour compared to usual or routine care. In regards to using breathing exercises compared to usual or routine care, a statistically significant increase in vaginal delivery rates or a decrease in the total duration of labour, the duration of pain, caesarean delivery rates and episiotomy rates could not be demonstrated.

One systematic review provided moderate certainty evidence in favour of yoga during labour. It was shown that yoga resulted in a statistically significant decrease in the use of pharmacological pain relief and length of labour compared to usual care.

Three systematic reviews provided moderate-certainty evidence in favour of listening to music during labour. It was shown that listening to music resulted in a statistically significant decrease in labour pain, duration of the second stage of labour, heart rate and (systolic and diastolic) blood pressure compared to usual care or placebo. It was also shown that listening to

self-selected music resulted in a statistically significant decrease in anxiety, but this could not be demonstrated for music that was selected by someone else. A statistically significant decrease in assisted vaginal birth rates, caesarean section rates, admission to a special care nursery and use of pharmacological pain relief could not be demonstrated.

Restriction of oral fluid and food intake

Moderate-certainty evidence from one Cochrane systematic review could not demonstrate a statistically significant improvement in health-related maternal or foetal outcomes, using any or complete restriction of oral fluid and food compared to some fluid and food or freedom to eat and drink. The evidence was declared stable and the evidence summary was not updated further.

Heat or cold application

CEBaP identified low-certainty evidence (downgraded for risk of bias and imprecision due to the low number of events and wide confidence intervals) from one Cochrane systematic review. The review could not demonstrate a statistically significant difference for a first-degree tear or episiotomy when using cold compresses compared to not using them. The current update of the evidence summary identified two other systematic reviews and found evidence in favour of heat therapy. It was shown that the application of heat (e.g. warm compresses to the perineal area or to the lumbo-sacral area, a hot bath or the use of a hot water bottle on the lower back and abdomen) resulted in a statistically significant decrease in the level of pain intensity during the first stage of labour, compared to standard treatment. It was shown that warm perineal compresses resulted in a statistically significant decrease in the risk of second-, third-, and fourth-degree tears and episiotomy, and a statistically significant increase in the intact perineum, compared to hands-off routine care or Ritgen's manoeuvre. However, a statistically significant difference in first-degree tears was not demonstrated when using warm compresses compared to hands-off, routine care, or Ritgen's manoeuvre.

Body position

First phase of labour

CEBaP identified moderate-certainty evidence (downgraded for risk of bias) from one Cochrane systematic review, showing that an upright position (sitting, standing or walking) seems to have better maternal outcomes than a lying position during the first phase of labour.

It was shown that upright and ambulant positions resulted in a statistically significant decreased duration of first stage labour, a decreased risk of caesarean birth and a decreased risk of maternal pain, compared to recumbent positions and bed care (Lawrence, 2013). However, a statistically significant difference in spontaneous vaginal birth, operative vaginal birth, maternal satisfaction, maternal comfort, maternal anxiety, duration of second stage of labour, augmentation of labour using oxytocin, artificial rupture of membranes, estimated blood loss >500 mL and perineal trauma, using upright and ambulant positions compared to recumbent positions and bed care, could not be demonstrated.

It was shown that sitting resulted in a statistically significant decrease in the duration of first-stage labour and a decreased risk of operative vaginal birth, compared to lying down, lying

on the back or lying on the side. However, a statistically significant difference in spontaneous vaginal birth and caesarean birth in the sitting position compared to the lying down positions could not be demonstrated. Furthermore, a statistically significant difference in the duration of first labour and caesarean birth when sitting compared to bed care could not be demonstrated.

It was shown that walking resulted in a statistically significant increase in spontaneous vaginal birth, a decreased duration of first stage labour and a decreased risk of operative vaginal and caesarean birth, compared to recumbent/supine/lateral positions.

A statistically significant difference in the duration of first labour, spontaneous vaginal birth, operative birth, and caesarean birth, when sitting, standing, squatting, kneeling or walking compared to lying down on the back or side, could not be demonstrated.

There is low-certainty evidence from one Cochrane systematic review showing that a statistically significant difference in foetal distress, use of neonatal mechanical ventilation, Apgar scores and perinatal mortality, using upright and ambulant positions compared to recumbent positions and bed care, could not be demonstrated.

Second phase of labour

Low certainty evidence from one systematic review showed that an upright position (semi-sitting, kneeling, sitting on hands and knees) during the second phase of labour (pushing phase) seems to ensure fewer assisted births, a shorter duration of the pushing phase, fewer third- and fourth-degree perineal tears and fewer perineum incisions than a lying down position.

Low-certainty evidence from another systematic review showed contradictory evidence about squatting during the second phase of labour: on the one hand, there are fewer assisted births and a lower risk of placenta retention, but on the other hand, it may lead to more caesarean sections.

Early skin-to-skin contact

There is low-certainty evidence from one Cochrane systematic review in favour of skin-to-skin contact between the mother and baby immediately after birth to improve breastfeeding and infant and maternal outcomes. It was shown that skin-to-skin contact resulted in a statistically significant increased number of mothers breastfeeding one to four months post-birth, increased duration of breastfeeding, increased number of mothers exclusively breastfeeding at hospital discharge to one-month post-birth, increased number of mothers exclusively breastfeeding six weeks to six months post-birth, increased success of first breastfeeding, increased successful first breastfeeding (IBFAT 10–12 or BAT 8–12), increased mean variation in maternal breast temperature 30–120 minutes post-birth and reduced breast engorgement (pain, tension, hardness) three days post-birth, compared to standard care.

However, a statistically significant difference in the number of mothers with a breastfeeding status from day 28 to one month post-birth, number of mothers breastfeeding one year post-birth, number of babies suckled during the first two hours post-birth, and using skin-to-skin contact compared to standard care could not be demonstrated. It was shown that skin-to-skin contact resulted in statistically significant increased SCRIP score (Stability of the

Cardio-Respiratory System in Preterm infants) first six hours post-birth, increased blood glucose (mg/dL) at 75–180 minutes post-birth, increased infant axillary temperature 90–150 minutes post-birth, increased number of infants who did not exceed parameters for stability, increased number of infants who did not cry less than one minute during a 90 minute period and decreased amount of crying in minutes during a 75 minute observation period, compared to standard care.

However, a statistically significant difference could not be demonstrated between skin-to-skin contact and standard care in terms of: respiratory rate (75–120 minutes post-birth), heart rate (75–120 minutes post-birth), number of infants transferred to the neonatal intensive care unit, infant body weight change (grams) day 14 post-birth and infant hospital length of stay in hours.

It was shown that skin-to-skin contact resulted in a statistically significant reduction in maternal state anxiety eight hours to three days post-birth, increased PCERA (Parent-Child Early Relational Assessment) dyadic mutuality and reciprocity 12 months post-birth, and increased the mother's most certain preference for similar post-delivery care in the future, compared to standard care.

However, a statistically significant difference using skin-to-skin contact compared to standard care could not be demonstrated for the following outcomes: PCERA maternal positive affective involvement and responsiveness 12 months post-birth, maternal parenting confidence at one month post-birth and maternal pain four hours post-caesarean birth.

The evidence was declared stable and the evidence summary was not updated further.

Cutting or clamping the umbilical cord

CEBaP could not identify any scientific studies on the umbilical cord cutting technique.

ILCOR conducted a systematic review, published in 2021, on the timing of umbilical cord clamping. The review compared later/delayed cord clamping, defined as application of a clamp to the umbilical cord ≥30 seconds after birth, to early cord clamping, defined as application of a clamp to the umbilical cord <30 seconds after birth (Gomersall, 2021). The review includes 33 randomized controlled trials with 5,263 mothers and their infants comparing delayed and early cord clamping. For the neonatal outcomes, delayed cord clamping showed more favourable haemoglobin and haematocrit levels at birth; however, a difference in mortality, resuscitation, intensive care admission, hyperbilirubinaemia, anaemia, ferritin concentrations and moderate to severe neurodevelopmental impairment in early childhood, could not be demonstrated. In addition, a difference in maternal outcomes (postpartum haemorrhaging, manual removal of placenta) could not be demonstrated. Based on the evidence, ILCOR suggests later (delayed) clamping of the cord at ≥60 seconds for term and late preterm infants born at ≥34 weeks' gestation who are vigorous or deemed not to require immediate resuscitation at birth (Wyckoff et al., 2021; Wyckoff, et al., 2022b; Wyckoff, et al., 2022c).

Manual uterine massage for postpartum haemorrhage

ILCOR conducted a systematic review, included in the CoSTR publication of 2025, about manual uterine massage in the immediate postpartum period (Djärv et al., 2025a; Djärv et al., 2025b).

One study found that self-massage every 15 minutes for the first two hours after birth resulted in a non-statistically significant decrease in blood loss and the need for blood transfusion. ILCOR formulated a weak recommendation of external uterine (self-)massage in the immediate postpartum period to prevent postpartum haemorrhage, which can lead to maternal death.

Non-systematic reviews

A few scientific studies are available that focus on the risk of umbilical cord prolapse after the waters have broken (occurring in approximately 0.4% of births) (Dekker, 2018) The outcomes of umbilical cord prolapse have improved within the past 10–20 years and more recent studies (from 2002–2012) show that deaths of babies related to umbilical cord prolapse have become extremely rare, mainly associated with prematurity.

Furthermore, there are no studies that test whether bed rest reduces the risk of cord prolapse in women with term PROM ("premature" rupture of membranes before the start of labour past 37 weeks of gestation) (Dekker, 2018).

Sore throat

Key action

Advise the person to take the recommended dose of paracetamol (also known as acetaminophen) to relieve their pain.

Introduction

A sore throat is characterized by a dry, scratchy pain in the throat, often worse when swallowing. It can be caused by several conditions such as a viral or bacterial infection (also known as a cold) and generally does not need medical treatment. Roughly four out of five people recover well within a week (Gunnarsson et al., 2023). However, a bacterial infection can be serious. Individuals between the ages of five and 24 are most likely to get a sore throat, especially during the early spring or winter months (Rughani, 2019). Sometimes a sore throat can be severe enough to cause the airway to swell. In these instances, the person should access medical care.

Guidelines

- Paracetamol can reduce the pain caused by a sore throat.**
- Drinking a hot drink may relieve the pain.*
- Medicated lozenges (containing benzocaine or hexylresorcinol) or mouth sprays (containing chlorhexidine gluconate and benzydamine hydrochloride) may relieve the pain.*
- Antibiotics should only be given if prescribed by a medical professional.**

Good practice points

- Nonsteroidal anti-inflammatory drugs (such as ibuprofen) can be used as a second-line treatment for sore throat, should paracetamol be ineffective.
- The first aid provider should encourage the person to drink water in small amounts.
- Harsh or high-pitched breathing sounds, the inability to swallow, severe pain or drooling are signs and symptoms of potential airway swelling that should receive urgent medical care.
- If a first aid provider suspects the person has a swollen airway, they should help the person rest in a comfortable position and access medical care.
- Smoking, talking a lot, singing and shouting may make a sore throat last longer. The person should speak as little as possible, speak at their normal volume and avoid whispering.

Chain of survival behaviours

Prevent and prepare

- Avoid people who are sick with an infectious illness such as influenza or strep throat (streptococcal infection), or create a barrier (e.g. mask) between people.

- Wash your hands with soap and water or use hand sanitizer to prevent the spread of the common cold (G. M. Allan & Arroll, 2014).
- Avoid smoking and smoky environments.

Early recognition

A person with a sore throat may:

- complain of a painful or dry, scratchy throat, especially when swallowing
- have swollen neck glands, redness at the back of the throat, swollen tonsils or whitish spots in the throat
- experience difficulty eating and drinking.

The person may also have pain in their ear, see earache or fever. Children in particular may experience vomiting or abdominal pain.

First aid steps

1. Advise the person to take the recommended dose of paracetamol to relieve their pain.
2. Encourage the person to drink lots of water in small amounts. A hot drink may relieve their pain.

Access help

- The first aid provider should access medical care if someone with a sore throat:
    - has difficulty breathing
    - also experiences fever, dehydration, a painful neck or a rash
    - is not able to drink
    - has severe pain
    - is unable to manage any secretions (e.g. drooling)
    - develops an earache with pain radiating in one ear
    - has difficulty opening the mouth
    - has a high fever (39.5-41°C or 103.1-105.8°F) when taken with a thermometer that measures heat from the tympanic membrane in the ear.
    - has severe throat pain and paracetamol has no effect
    - does not see any improvements after multiple days
    - experiences a sore throat frequently.

Education considerations

Context considerations

- It can be difficult for people to identify the cause of a sore throat (viral, bacterial or environmental). Early actions, such as giving the ill person a drink, can help to eliminate some causes and help the learner to identify if the condition is more serious.
- Encourage learners to look for other signs and symptoms and consider potential causes, such as whether the person has been near someone with a cold or influenza, as this will help inform treatment.
- In some contexts, local pharmacies can provide advice and treatment if the cause is viral and help identify if the cause is more serious and requires medical attention.

- Follow your national regulations on who can administer non-prescribed painkillers as their regulations overrule these guidelines.

Facilitation tips and tools

- Pictures that illustrate signs of more serious medical conditions can be helpful for learners to understand if the person needs medical treatment.
- Emphasize that while most sore throats are usually not serious, they may be a symptom of a more severe condition, and learners must recognize the situations in which to access medical care.
- Draw connections to other topics within first aid when exploring sore throat, such as recognizing signs of a serious illness, and assessment skills (e.g. asking about the history of the person's symptoms).

Scientific foundation

Systematic reviews

We identified four relevant evidence reviews on this topic, one by the British National Institute for Health and Care Excellence (NICE), two systematic reviews and two evidence summaries from the Centre for Evidence-Based Practice (CEBaP).

Medication options

For their guideline on acute sore throat, NICE conducted an evidence review that included self-care interventions to relieve symptoms, such as paracetamol or ibuprofen, medicated lozenges and mouth sprays (National Institute for Health and Care Excellence, 2018)

No systematic reviews or randomized controlled trials were identified that compared non-medicated lozenges, non-medicated mouthwashes or any other non-pharmacological interventions with placebo or another intervention in people with acute sore throat.

Three randomized controlled trials found that aspirin, paracetamol and diclofenac potassium were all more effective than placebo at improving pain and reducing fever in adults with an acute sore throat, although it is not clear whether the improvements were clinically meaningful (low- to moderate-certainty evidence).

Results from six randomized controlled trials found statistically significant improvements in pain scores with medicated lozenges (containing benzocaine, hexylresorcinol or flurbiprofen) compared with placebo, although the absolute improvements were small and may not be clinically meaningful for some lozenges (low- to moderate-certainty evidence). In one randomized controlled trial that provided evidence on the effectiveness of a chlorhexidine gluconate and benzydamine hydrochloride mouth spray, the intensity of the clinical signs was statistically significantly decreased, and the reported health state was statistically significantly improved. No differences were observed in their quality of life (moderate- to high-certainty evidence).

A CEBaP evidence summary from 2020 on the use of paracetamol in case of sore throat, identified eight randomized controlled trials. The summary was updated in 2024 and did not

identify any new studies. It was demonstrated that paracetamol led to a statistically significant decrease in pain intensity (upon swallowing) and a statistically significant increase in pain relief and improvement in the swollen throat, compared to the placebo. A statistically significant change in sore throat (ordinal outcome), sore throat or time point or spontaneous pain, using paracetamol compared to placebo, could not be demonstrated in two studies. Evidence is of moderate certainty and results cannot be considered precise due to limited sample size and/or lack of data.

The Cochrane review (Spinks et al., 2013) determined that antibiotics can be used to treat a sore throat. While most people usually recover within five to seven days, some develop complications. A severe (but rare) complication is rheumatic fever, affecting the heart and joints. Streptococcal infections rarely lead to airway swelling from abscess formation around the pharynx and tonsils. Antibiotics reduce the duration of strep throat symptoms (streptococcal infection) by an average of one to two days. However, these medications can also cause diarrhoea, a rash and other unfavourable side effects. Additionally, when antibiotics are taken unnecessarily, they can contribute to the development of bacterial antibiotic resistance. The review concluded that the benefits do not outweigh the multiple and at times serious side effects. The NICE guideline also states that antibiotics do not help alleviate throat pain caused by a virus (National Institute for Health and Care Excellence, 2018)

Non-medication options

A CEBaP evidence summary found limited evidence in favour of consuming a hot drink (CEBaP, 2024). One uncontrolled before-and-after study showed that having a hot drink resulted in a statistically significant decrease in the symptoms of sore throat. A statistically significant decrease in symptoms of a sore throat when having a drink at room temperature could not be demonstrated. Evidence is of very low certainty and results cannot be considered precise due to limited sample size and lack of data. No new studies were identified in the most recent update of the summary.

Non-systematic reviews

Limited evidence states that frequently gargling with warm water and salt may help to reduce episodes of upper respiratory tract infection (G. M. Allan & Arroll, 2014).

In most patients, an acute sore throat is classified as uncomplicated; however, there are cases where it is potentially complicated. It is rare for patients with a sore throat to develop a critical illness and require immediate medical care (Gunnarsson et al., 2023).

We also reviewed two papers on the condition epiglottis, a type of airway swelling, that has decreased over the last 20 years because of immunization; however, it is still prevalent in unimmunized populations. Unimmunized people are at risk, including children, people in areas with no immunizations, and people over 45 with outdated immunizations. Inflammation of the epiglottis and surrounding tissues can lead to a narrowing of the airway and produce specific stridor (high-pitched, abnormal breathing sounds). People with epiglottitis may initially experience a sore throat, fever and breathing difficulty. They also characteristically do not have a cough. First aid providers should help the person get into a position in which they are most

comfortable and help them access medical care immediately (Adil et al., 2015; Lindquist et al., 2017).

Earache

Key action

Advise the person to take the recommended dose of paracetamol (also known as acetaminophen) and seek medical attention if the earache remains or gets worse over 48 hours.

Guidelines

- If trained and it is safe to do so, first aid providers may give the person paracetamol for pain relief.*

Good practice points

- Advise the person not to pick their ear as this can cause damage to the ear.
- Medical advice should be sought when there is fever, fluid draining from the ear, vertigo or loss of or decreased hearing associated with ear pain.
- The person should seek medical advice if the symptoms get worse or do not improve within 48 hours.
- A source of heat can be held against the affected area and may reduce pain.

Chain of survival behaviours

Prevent and prepare

- Teach children to avoid putting objects in their ears, such as cotton swabs or buds, or pencils.
- People using noisy equipment should use ear defenders to reduce noise below 85 decibels.
- Be alert to earaches in people who use a hearing aid or who listen to music through headphones.
- Be alert to earaches in people who spend a lot of time in the water, have an abscess or infection in their gums or have had a cold or flu.
- Keep ears warm and dry where possible.

Early recognition

- The person may complain of pain, changes in hearing or a sensation of fullness in their ear.
- The ear may be hot or sensitive to touch.

First aid steps

1. Help the person take the recommended dose of an over-the-counter painkiller (e.g. paracetamol) to reduce pain.
2. Give them a warm compress, such as a hot water bottle wrapped in a towel, to hold against their ear to reduce pain.
3. In the case that there is something in the ear canal (e.g. insects, beads), do not try to remove it. Seek medical advice.

Access help

- Seek medical advice if there is discharge coming from the ear, hearing loss, vertigo or fever. Seek medical advice if the earache does not improve within 48 hours.

Education considerations

Learner considerations

- Individuals who look after children or spend time in water contexts (e.g. public swimming pool) could benefit from learning about earaches.

Scientific foundation

Systematic reviews

Three evidence summaries from the Centre for Evidence-Based Practice, all updated in 2024, form the scientific foundation for this topic.

An evidence summary about using paracetamol in case of earache resulted in the identification of a Cochrane systematic review, which included one randomized controlled trial. It was shown that paracetamol resulted in a statistically significant decrease in pain in the ear compared to no paracetamol. Evidence is of low certainty and results cannot be precise due to limited sample size.

An evidence summary about heat or cold application in case of earache, as well as an evidence summary about posture in case of earache, could not identify any studies.

Non-systematic reviews

Earache is an infection of the middle ear that causes inflammation and a build-up of fluid behind the eardrum. An earache can develop from inflammation of the outer, middle or inner ear and is often caused by an infection in the case of a cold or flu (Pukander, 1983). An ear can become painful if an object is stuck in the ear canal. Pain from a tooth, such as an abscess, can also cause an earache. An earache can cause temporary hearing loss and infection can cause pus to gather in the middle of the ear, causing the eardrum to rupture.

Acute earache predominantly occurs in children. Canadian research shows that babies between six and 15 months old are most commonly affected (Casselbrant & Mandel, 2003). It is estimated that around one in every four children experiences at least one middle ear infection by the time they are 10 years old. Medical care should be sought when there is fever, ear drainage, vertigo, loss of hearing or decreased hearing associated with ear pain (Worrall, 2011).

An outer ear infection is one of the more common diseases and is also frequently encountered in primary and paediatric care. More than 90% of cases are caused by bacteria (Wiegand et al., 2019). An outer ear infection is thought to affect 10% of people at some stage and can present in acute, chronic or necrotizing forms. The inflammation may be associated with eczema of the ear canal and is more common in humid environments, in individuals with narrow ear canals, those who swim regularly or use a hearing aid, and after mechanical trauma, such as from ear cleaning or the use of earphones that go into the canal.

Outer ear infection ranges in severity from a mild infection of the external auditory canal to a life-threatening infection. Pain relief is an essential part of the treatment of outer ear infection (Wiegand et al., 2019). A general practitioner should do the treatment. Individuals should not clean their ears with cotton swabs, as this may damage them and encourage bacterial growth.

It has been estimated that in around 80% to 85% of children with an earache, the fever and pain resolve within two to three days. After seven days, the absence of all symptoms and signs (except for middle ear effusion) can be expected. The use of nasal drops or spray containing xylometazoline has no effect on earache and is not recommended (Coleman & Moore, 2008).

Headache

Key action

Advise the person to take the recommended dose of paracetamol (also known as acetaminophen).

Introduction

Headaches are a common condition. Typical symptoms include a mild to painful throbbing or tight sensation in the head, pain behind the eyes (especially when looking at bright lights) or dizziness. In more extreme cases, symptoms might include nausea or vomiting. A migraine is a type of headache that is often reoccurring. Usually, a headache does not have a serious cause and will pass; however, in some cases, it can indicate a more serious condition. First aid providers should seek to understand the probable cause of the headache.

Guidelines

- If a person experiences a tension-type headache or an acute migraine headache, the first aid provider should advise them to take 1,000 mg of paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen.**

Good practice points

- Paracetamol and other painkillers should only be used if a headache results from minor causes such as tiredness or stress.
- Applying an ice pack or cold compress to the head or back of the neck may provide relief from migraine symptoms.
- Bright lights (e.g. from an office or phone screen) may make a headache or migraine worse. If the individual with either condition is sensitive to light, they should sit or lie in a dark or dimly lit room to increase comfort and reduce the pain.
- Individuals with a headache should get fresh air, get enough sleep, drink water regularly and take time to relax.

Chain of survival behaviours

Prevent and prepare

- Understanding the causes of headaches can help prevent them from occurring. Headaches can be caused by:
    - stress
    - poor sleep
    - flu or cold
    - meningitis
    - Hyperthermia
    - Head injury
    - Dehydration

    - alcohol consumption.
- The use of painkillers such as paracetamol is most effective when taken at the early stages of the onset of pain. Taking a painkiller at the first sign of a headache may prevent a more severe one from developing.

Early recognition

A person may have a headache if they:

- have pain behind their eyes
- feel a tightness around their head
- have painful throbbing in their head
- have an increased sensitivity to noise or light
- are nauseous.

The condition may indicate another more severe condition if the headache is accompanied by:

- fever
- vomiting (without diarrhoea or fever)
- skin rash
- memory loss
- neck pain or stiffness
- coordination problems
- problems with eyesight
- drowsiness or sleepiness
- trauma to the head.

The pain caused by a headache can range in frequency and severity.

First aid steps

1. Reduce anything that may worsen the headache (such as direct sunlight or noise). If safe to do so, move the person to a quiet space.
2. Advise the person to take 1,000 mg of paracetamol.
3. Advise them to rest in a dark, quiet room. It may help to place an ice pack or cold compress on their head or neck.

Access help

Headaches can sometimes indicate a more serious underlying disorder. Access emergency medical care if the headache is severe and is accompanied by:

- vomiting (without diarrhoea or fever)
- a sore or stiff neck
- a rash, as this may indicate meningitis
- memory loss
- double or blurred vision
- fever
- signs of a Stroke.

Or if the severe pain:

- follows a head injury
- becomes worse very fast
- occurs during exertion (e.g. exercise) or a change in posture
- started suddenly within the last three months of pregnancy
- does not go away even after taking painkillers or reducing potential causes
- occurs regularly, without explanation, in children under the age of six.

Recovery

- The person may take painkillers for frequent tension headaches as required, following the advice provided with the medication regarding frequency and over what time period. However, if the headache persists or new patterns emerge, the person should seek a medical assessment.
- Follow any recovery instructions from the healthcare professional.

Education considerations

Context considerations

- Areas with limited resources may not have painkillers readily available. Emphasize rest, hydration, relaxation techniques and a cool cloth on the forehead or neck as effective first aid support for mild headaches.
- Follow your local regulations on who can administer non-prescribed painkillers as the regulations overrule these guidelines.

Facilitation tips

- Plan to facilitate the topic of headaches after other critical first aid skills so that learners are better able to contextualize what a headache might indicate.
- Emphasize that while most headaches are usually not serious, they may be a symptom of a more severe condition and learners must recognize the situations in which to access medical care.
- Use scenarios as a way to connect headaches to other illnesses and injuries within first aid. For example, run two to three scenarios where the person's headache is caused by something different. Learners must identify what the cause is and provide appropriate care.

Learning connections

- Use this topic to practise assessment skills such as asking about the history of the person's symptoms.
- Draw connections to other topics within first aid when exploring headaches such as recognizing signs of meningitis, Head injury and concussion and Stroke.

Scientific foundation

Systematic reviews

Headache is the most prevalent neurological manifestation in adults and one of the leading causes of disability worldwide. In children and adolescents, headaches have a substantial impact

on quality of life, limiting social and physical activities, and school attendance, which in turn results in weaker learning outcomes, a higher risk of dropping out of school and a negative effect on parents' careers. Migraine is also associated with the presence of two or more conditions (comorbidities) such as allergies, sleep disorders, emotional and behavioural problems, depression and anxiety, and academic performance (Onofri et al., 2023).

We used a 2020 evidence summary by the Centre for Evidence-Based Practice (CEBaP), as well as an additional systematic review from 2010 on the topic of headaches. The CEBaP summary was not updated, as the evidence was declared stable.

CEBaP identified a Cochrane systematic review, including 23 randomized controlled trials, on the use of paracetamol for tension-type headaches, and selected five relevant randomized controlled trials from a second Cochrane review about the use of paracetamol for acute migraine headaches.

There is limited evidence in favour of using paracetamol for acute migraine headaches. It was shown that 1,000 mg paracetamol resulted in a statistically significant decrease in acute migraine headache, adverse events, functional disability and use of rescue medication compared to placebo. Evidence is of moderate certainty and results cannot be considered precise due to the low number of events and large variability of results.

In addition, there is high-certainty evidence in favour of using paracetamol for tension-type headaches. It was shown that 1,000 mg paracetamol resulted in a statistically significant decrease in tension-type headache and the use of rescue medication, compared to placebo. A statistically significant decrease in tension-type headache and use of rescue medication, using 500–650 mg paracetamol compared to placebo, could not be demonstrated.

A systematic review from 2010 (Verhagen et al., 2010) evaluated the effectiveness of NSAIDs in people with tension-type headaches. The evidence showed that NSAIDs are more effective than a placebo medication for short-term pain relief. When comparing NSAIDs and paracetamol there was a significant difference in favour of using NSAIDs. The review found no significant differences between the different types of NSAIDs, but ibuprofen showed fewer short-term side effects.

This review also concluded there is insufficient evidence for or against the effectiveness of the preventive medication, physiotherapy, (spinal) manipulation or cognitive behavioural treatment in people with tension-type headache.

Non-systematic reviews

One randomized controlled crossover clinical trial evaluated the benefits of cooling the blood that passes through the carotid arteries versus no cooling treatment. An adjustable wrap containing two ice packs was used as the cooling mechanism, targeting the carotid arteries at the neck (where they are close to the skin's surface). A total of 55 participants completed the study successfully. They observed maximum pain reduction at 30 minutes, with a 31.8% ± 15.2% decrease in pain in the treatment arm (where cooling was applied) compared to a 31.5% ± 20.0% increase in pain at the same time interval in the control arm (no cooling). The study found that a frozen neck wrap, applied at the onset of a migraine, targeting the carotid arteries in the neck,

significantly reduced the pain for participants with a migraine ($p<.001$) (Sprouse-Blum et al., 2013).

Hiccups

Key action

Comfort and reassure the person.

Introduction

A hiccup (or hiccough) is a sudden contraction of a muscle called the diaphragm that helps a person to breathe in and that repeats several times per minute. During a hiccup, the muscle contraction causes the person to take in a quick breath. This breath in is then interrupted by the epiglottis closing over the windpipe, making a “hic” sound. Hiccups can occur “spontaneously”, after eating or drinking, or in the context of a wide variety of illnesses or medical interventions. Short hiccup spells are commonly experienced by healthy children and adults. Adult males are more likely to experience episodes of hiccups (Lee et al., 2016).

Good practice points

- Home remedies such as holding one’s breath for a couple of seconds, doing the Valsalva manoeuvre for a short time, sipping ice-cold water, swallowing some granulated sugar, biting into a lemon or tasting vinegar may be effective.
- The use of gripe water is not recommended.
- A person with hiccups should seek medical advice if hiccups last longer than 48 hours or if they have other symptoms in combination with hiccups, such as chest pain, weakness in their limbs or face, headache or trouble keeping balance.

Chain of survival behaviours

Prevent and prepare

- Giving babies a break from feeding and burping them may reduce the amount of air in their stomachs and may help prevent hiccups.
- Eating slowly and avoiding alcohol may help reduce the likelihood of hiccups.

Early recognition

- A person with hiccups will take a short breath inward, followed by a “hic” sound. This can occur between two and 60 times per minute.

First aid steps

1. Comfort the person and reassure them that hiccups usually pass after a few minutes.
2. If they can, encourage them to perform the Valsalva manoeuvre (take a deep breath in, close the nose and mouth and gently blow out) for a short time.

There are other methods to stop hiccups that may be more suited to some contexts.

- Drink a glass of ice-cold water.
- Suck a sugar cube or an ice cube.
- Bite into a lemon.

- Hold your breath for a couple of seconds.

Access help

- Generally, hiccups pass within a few minutes. Seek medical advice if the hiccups last longer than 48 hours or if the person has other symptoms in combination with hiccups, such as chest pain, weakness in their limbs or face, headache or trouble keeping balance.

Education considerations

Learner considerations

- This topic may be useful for some audiences such as school nurses, new parents or other people who care for children.

Facilitation tips

- Define what a hiccup is, how it happens and discuss different safe home remedies.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) developed an evidence summary concerning techniques to stop hiccups, but no studies could be identified.

Non-systematic reviews

Hiccups are classified based on their duration. Short hiccup spells are commonly experienced by healthy children and adults. Hiccups resolve spontaneously or with simple home remedies and do not require medical attention. Short hiccup bouts are mostly associated with gastric distention, such as drinking carbonated beverages, consuming spicy, very hot or very cold food or alcohol intake. In the foetus, hiccups are normally present after the eighth week of gestation during behavioural active phases and tend to persist after birth in babies (Launois et al., 1993).

Babies often get hiccups when feeding. Hiccups do not normally harm a baby and will go away once the baby is one year old. Usually, a baby will have the hiccups for only a few minutes. Taking a break from feeding to burp the baby may reduce the amount of air in their stomach and prevent hiccups. No scientific evidence has been found for the use of gripe water (a mixture of herbs and water traditionally used to treat colic and other stomach problems). It is not recommended for babies (Adhisivam, 2012).

The purpose of some home remedies is the attempt to interrupt the reflex arc thought to maintain repetitive diaphragmatic contractions. This is most often attempted by breath-holding, the Valsalva manoeuvre (a particular way of breathing that increases pressure in the chest) or breathing into a paper bag. Other home remedies to stop hiccups include sucking an ice cube, sucking a sugar cube with vinegar, chewing a piece of lemon, holding your breath and scaring someone with hiccups. These home remedies are, in general, not harmful and may be effective only in shortening acute hiccups and not in the treatment of persistent or recurrent hiccups (Goldstein, 1999; Quiroga et al., 2016).

Prolonged hiccups are rare in healthy people. However, hiccups lasting more than 48 hours are not uncommon in people with advanced disease. They are disabling and may induce

depression, weight loss and sleep deprivation. A wide variety of pathological conditions can cause chronic hiccups, including myocardial infarction, brain tumour, renal failure, prostate cancer and abdominal surgery (Quiroga et al., 2016; Rey & Solari, 2010). Any hiccup episode lasting longer than 48 hours is described as chronic and needs medical attention (Bacak & Danner, 2023; Petroianu, 2005).

ENVIRONMENTAL

Hyperthermia

Key action

Rapidly cool the person to reduce their body temperature.

Introduction

Hyperthermia occurs when the body reaches abnormally high temperatures because it is unable to regulate its internal temperature. It occurs when the body produces or absorbs too much heat, or a combination of both. Hyperthermia can be mild (heat exhaustion) or severe (heatstroke). There are two types of hyperthermia: exertional heat illness (EHI), when the body produces too much heat, and non-exertional heat illness (or "classic" hyperthermia), when the body absorbs too much heat. Children and the elderly are most at risk for a "classic" hyperthermia.

Exertional heatstroke is a medical emergency characterized by life-threatening hyperthermia and central nervous system dysfunction during or directly after exercise. Early recognition and aggressive cooling reduce the morbidity and mortality of a person with heatstroke (Van den Bersselaar, 2020).

Guidelines

- In the case of an adult experiencing severe hyperthermia (heatstroke) due to intense physical activity, the first aid provider should consider immersing the person from the neck down in cold water (1-26°C/33.8-78.8°F) until a core body temperature of less than 39°C (102.2°F) is achieved. If this is not possible, cool the person using any other active cooling technique (e.g. a wet sheet, water or ice packs placed in the armpits, neck and groin area).**

Good practice points

- The person should stop all physical activity and be removed from the hot environment to a cool place.
- For people with hyperthermia due to intense physical activity, first aid providers can also consider using other immediate active or passive cooling techniques available to them (e.g. cold-water immersion of hands or feet, ice packs, cold showers, fanning, ice sheets and towels).
- If the person has hyperthermia due to intense physical activity and is responsive enough, they may have something cool to drink. This may include water, a water and sugar solution or a water and salt solution (e.g. a homemade oral rehydration solution or a sports drink). See Dehydration.
- The first aid provider should access emergency medical services (EMS) if the person:
    - shows unusual behaviour, confusion or becomes unresponsive
    - has a seizure
    - has a body temperature above 39°C (102.2°F)

    - stops sweating
    - cannot drink without vomiting.

Chain of survival behaviours

Prevent and prepare

- The risk of hyperthermia depends on a person's ability to adapt to heat. This adaptability depends on four factors:
    - activity level (e.g. limit physical activities during the hottest part of the day)
    - freedom of choice of clothing (e.g. wear appropriate clothing for the temperature and activity)
    - adaptability to the environment (e.g. take frequent breaks to drink water)
    - personal factors (e.g. a person's health and fitness level)
- In places where there is a high risk of hyperthermia, consider making cooling methods available so there is no delay in first aid when hyperthermia occurs.
- Be aware that EHI can also occur in cool environments.
- Monitor weather conditions.
- Plan work and rest times if working in warm conditions.
- Develop an action plan in case conditions suddenly change and there is a higher risk of hyperthermia (e.g. a sudden heatwave).
- Monitor urine colour for signs of dehydration.

Early recognition

The person's condition will depend on how much the body has overheated.

Mild to moderate hyperthermia (heat exhaustion):

- normal or mildly higher temperature
- cool, pale, clammy skin
- excessive sweating
- thirsty
- headache
- muscle cramps
- rapid, weak pulse
- fainting or dizziness.

Severe hyperthermia (heatstroke or heat stress combined with an altered mental status):

- the person has stopped sweating (indicating they are severely dehydrated)
- high body temperature (above 40°C/104°F)
- dry, flushed, hot skin
- nausea
- muscle spasms
- feeling lightheaded or dizzy, disoriented
- pain throughout the body
- unusual behaviour (aggressive combativeness or drowsiness) or signs of confusion
- seizure or possible loss of responsiveness.

First aid steps

1. Advise the person to stop all physical activity immediately. Help them to rest in a cool place and to remove any excess clothing.

Mild to moderate hyperthermia

1. Cool the person down using any technique available, such as immersing their hands and feet in cold water, applying ice packs to their neck and groin areas, encouraging them to have a cold shower or fanning them.
2. If the person is not vomiting, give them some water, sports drink or cold tea with sugar to drink.
3. Monitor the person's temperature and level of response. Try to reduce their temperature to less than 39°C (102.2°F).
4. A person with mild to moderate hyperthermia will usually recover without medical care. Monitor them closely in case their condition does not improve or worsens. And access EMS if in any doubt.

Severe hyperthermia

1. Access EMS immediately. Heatstroke is life-threatening. Be alert to any unusual behaviour (aggressive combativeness or drowsiness) or signs of confusion.
2. Help the person lie down in a cool place and remove any excess clothing.
3. Start cooling the person down immediately. Immerse the person in cold water (1-26° C/33.8-78.8°F) for about 15 minutes, or until their temperature has dropped to less than 39°C (102.2°F). If this is not possible (e.g. cold water is unavailable or the person is confused and refuses), cool the person using any other active cooling technique (e.g. place cool, wet sheets or towels on the person or wet them with cold water and place ice packs on their neck and groin areas). Fanning the person will also help cool them down.

- Severe hyperthermia (heatstroke) is a time critical illness and the priority is rapid and effective cooling prior to transfer to a hospital.
- If medical personnel are available, the person's core (rectal) temperature should be recorded as soon as possible as an indicator of severity and to guide treatment (DeGroot et al., 2022).

Recovery

- After cooling the person down, monitor them closely, as they may start to feel cold and shiver, especially if they are still wearing wet clothes. If this happens, give them a blanket.
- Encourage the person to drink oral rehydration solutions, sports drinks or tea with sugar. Start with a small amount and wait to ensure the person does not vomit the liquid back up.
- Encourage the person to rest. In most cases, people with mild to moderate hyperthermia will recover fully.

Education considerations

Context considerations

- Heat illnesses have become more common in areas affected by climate change. Education and prevention strategies should be developed in these areas, especially for the most vulnerable populations.
- Programme designers should consider any cultural or legal implications involved with removing the person's clothing and emphasize the importance of dignity to learners.
- In areas where ice or cold water is not readily available, identify the cooling methods that may be available, such as removing the person from the heat, wetting them, fanning them, encouraging rest and removing any excess clothing.
- In areas with extreme heat, workplaces may have regulations in place, such as stopping outdoor work during the hottest hours of the day throughout the hottest months of the year.

Learner considerations

- Infants and older adults are susceptible to heat exposure as their body systems are less efficient.
- Certain professions and athletes may have greater exposure to heat. Younger and faster runners are at higher risk for exertional hyperthermia and would benefit from learning about the risks and preventive strategies to avoid heat illness (Breslow et al., 2021).

Facilitation tips

- Focus on prevention and help learners recognize the warning signs of early hyperthermia so they can prevent severe hyperthermia.
- The key action is to cool the person quickly, so the first aid provider needs to prioritize readily available cooling methods.
- Emphasize that the body temperature should be reduced to 39°C (102.2°F) and not less to prevent over-cooling.

Learning connections

- Combine this topic with other first aid emergencies (such as Breathing difficulties or Seizures) so learners can recognize and differentiate the symptoms of hyperthermia.
- Dehydration is common in people with hyperthermia.

Scientific foundation

Systematic reviews

The International Liaison Committee on Resuscitation (ILCOR) first aid task force completed a systematic review of different techniques for cooling heatstroke and exertional hyperthermia (Douma, 2020), and the Centre for Evidence-based Practice (CEBaP) developed evidence summaries on reducing activity and drinking (2020). The CEBaP summaries were not updated as the evidence was declared stable. The ILCOR review was updated in 2022 and two new systematic reviews and two observational studies were identified. However, the topic did not meet criteria for an updated systematic review and existing treatment recommendations remained unchanged. For adults with exertional hyperthermia or exertional heatstroke, immediate active cooling using whole-body (neck down) water immersion techniques or, if

unavailable, any other active cooling technique is recommended. For adults and children with non-exertional heatstroke, no recommendations for or against any specific cooling techniques were made (Wyckoff et al., 2022b; Wyckoff et al., 2022c).

Cold-water immersion (14°C–15°C/57.2°F–59°F)

The following studies all relate to adults with exertional hyperthermia. In seven non-randomized controlled trials, a faster rate of core body temperature reduction was found with cold water immersion of the torso compared with passive cooling (low certainty of evidence). In three controlled trials, no significant mean difference in the rate of core body temperature reduction was found between cold water immersion of the torso compared with temperate-water immersion (20°C-26°C/68°F-78.8°F) (very low certainty evidence). One controlled trial showed no significant mean difference in the rate of body temperature reduction between the use of cold water immersion (14°C/57.2°F) of the torso and the use of colder water immersion (8°C/46.4°F) (low certainty evidence). Two controlled trials showed no significant mean difference in the rate of body temperature reduction when using cold water immersion (14°C/57.2°F) of the torso compared with ice-water immersion (2°C-5°C/35.6°F-41°F) (very low certainty evidence).

Cold-water immersion (10°C–17°C/50.0°F–62.6°F) of hands and feet

In six controlled trials, a faster rate of core body temperature reduction was found with cold water immersion of hands and/or feet (10°C-17°C/50.0-62.6°F) compared with passive cooling in adults with exertional hyperthermia (moderate certainty evidence).

Colder-water immersion (9°C–12°C/48.2°F–52.6°F)

The following studies in this paragraph relate to adults with exertional hyperthermia. In three non-randomized controlled trials, a faster rate of core body temperature reduction was found with the use of colder-water immersion of the torso (9°C-12°C/48.2°F-52.6°F) compared with passive (moderate certainty evidence). One controlled trial did not show a significant mean difference in the rate of core body temperature reduction with the use of colder-water immersion (9°C/48.2°F) up to the waist compared with passive cooling (low certainty evidence). One controlled trial showed a faster rate of core body temperature reduction with the use of colder-water immersion of the torso (11.7°C/53.0°F) compared with temperate water (23.5°C/74.3°F) (moderate certainty evidence). One controlled trial showed no significant mean difference in the rate of core body temperature reduction with the use of colder-water immersion of the hands or feet (10°C-12°C/50.0°F- 52.6°F) compared with the use of colder-water immersion of the torso (low-certainty evidence).

Ice-water immersion (1°C–5°C/33.8°F–41.0°F)

In one small cohort study where ice-water immersion of the torso (5°C-10°C/33.8°F-41°F) together with the administration of intravenous normal saline at room temperature 0.9% was compared with applying ice packs to the armpits in adults with exertional heatstroke, there were no deaths in either group (very low-certainty evidence). In four non-randomized controlled trials in adults with exertional hyperthermia and one cohort study on people with exertional heatstroke, a faster rate of core body temperature reduction was shown when comparing ice water immersion of the torso (1°C-5°C/33.8°F-41°F) with passive cooling (low-certainty evidence). The same was found in two non-randomized controlled trials comparing ice water torso

immersion (2°C/35.6°F) with temperate water immersion (20°C–26°C/68.0°F–78.8°F) (moderate-certainty evidence). One small cohort study in adults with exertional heatstroke showed a faster rate of core body temperature reduction in case of ice-water immersion (5°C-10°C/33.8°F-41.0°F) combined with the administration of intravenous 0.9% normal saline, compared with applying ice packs to the armpits (low certainty evidence).

Evaporative cooling (mist and fan)

Two controlled studies in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction between evaporative cooling and passive cooling (low-certainty evidence). Two controlled trials showed no significant mean difference in the rate of core body temperature reduction with evaporative cooling compared with the use of ice packs applied to the neck, armpit and groin (one trial, low-certainty evidence), or compared with the use of commercial ice packs applied to the neck, armpit and groin (one trial, low-certainty evidence). One controlled trial showed no significant difference in the rate of core body temperature reduction when using evaporative cooling and commercial ice packs on the neck, armpit and groin compared with evaporative cooling alone (low-certainty evidence). One controlled trial showed no significant difference in the rate of core body temperature reduction when using a combination of evaporative cooling and commercial ice packs on the neck, armpits and groin, compared with passive cooling (low-certainty evidence).

Commercial ice packs

Two controlled trials in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction when using commercial ice packs on the neck, groin and armpits compared with passive cooling (low-certainty evidence). One controlled trial in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction when using commercial ice packs on the whole body compared with passive cooling (low-certainty evidence). One controlled trial in adults with exertional hyperthermia showed a faster rate of core body temperature reduction when applying commercial ice packs to the cheeks, palms and soles compared to passive cooling, as well as when compared to applying commercial ice packs to the neck, groin and armpit (moderate-certainty evidence).

Fan alone

Two controlled trials in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction with the use of fanning alone compared with passive cooling (low-certainty evidence).

Cold shower (20.8°C/69.4°F)

In one non-randomized controlled trial in adults with exertional hyperthermia, a faster rate of core body temperature reduction was found with cold showers compared with passive cooling (moderate-certainty evidence).

Hand-cooling devices

Three controlled trials in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction when using hand-cooling devices compared with passive cooling (low-certainty evidence).

Cooling vests and jackets

Two controlled trials in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction when using the Arctic Heat cooling jacket compared to passive cooling (low-certainty evidence). Five controlled trials in adults with exertional hyperthermia compared the use of various cooling vests with passive cooling. None of the studies showed a significant mean difference in the rate of core body temperature reduction when compared to passive cooling (very low-certainty evidence).

Reflective blankets

One controlled trial in adults with exertional hyperthermia showed no significant mean difference in the rate of core body temperature reduction between the use of reflective blankets and passive cooling (low-certainty evidence).

Physical activity

There is limited evidence from one observational case-control study in favour of reducing physical activity. The study showed that decreasing activity resulted in a statistically significant decrease in the risk of heatstroke during heatwaves. Evidence is of very low certainty and results cannot be considered precise due to lack of data. (CEBaP, 2020.)

Drinking fluids

There is limited evidence from one observational case-control study in favour of taking in extra liquids. The study found that consuming extra liquids led to a statistically significant decrease in the risk of heatstroke during heatwaves. Evidence is of very low certainty and results cannot be considered precise due to a lack of data. (CEBaP, 2020.)

Non-systematic reviews

Early recognition and immediate cooling improve outcomes by reducing the area (in degree minutes) under the body temperature versus time curve. Several high-profile cases have demonstrated the catastrophic consequences associated with delayed diagnoses. Exertional heat illness (EHI) can also occur in cool environments and should be considered a potential cause of collapse in exercise settings, especially when accompanied by unexplained neurological symptoms (DeGroot et al., 2022; van den Bersselaar et al., 2020).

EHI is one of the rare exceptions in which treatment (cooling) is prioritized over transport (Belval et al., 2018). It is essential that organizers of mass-participation sporting events, athletic team medical personnel and military leaders adequately prepare for the possibility of EHI casualties when conditions warrant it (DeGroot et al., 2022).

According to Caldwell (2022), iced-sheet cooling (ISC) increases the cooling rate of those recovering from exertional hyperthermia. Based on the observed cooling rate, we can extrapolate that ISC would reduce core temperature by ~approximately 2°C within 30 minutes in

a case of EHI. The conclusion is that ISC provides a safe and effective alternative in fields where cold water immersion resources may not be readily available.

During cold-water immersion (CWI), several monitoring methods are available to determine the appropriate cessation, including continuous temperature measurement, regular temperature checks, the use of an equation to predict immersion time and symptom observation. There is no consensus on the best system; however, a monitoring method should be used to prevent overcooling. This case series highlights the importance of proper CWI execution to prevent harm (Stone & Sanchez, 2023).

Dehydration

Key action

Give the person plenty of fluids to drink as tolerated.

Introduction

Dehydration is a shortage of water in the body and occurs when a person loses more fluid than they take in. It can result from a range of conditions (vomiting, diarrhoea, heat stress, fever, etc.), vigorous activity in hot and humid environments, or when wearing excess clothing. These conditions result in a significant loss of water through sweat and other bodily fluids. They also cause the person to lose electrolytes, which are essential for the body to function normally. When the body is dehydrated, it can experience cramps, changes in mental capacity or even shock (which can be life-threatening if left untreated), especially in small children or older adults.

Guidelines

- First aid providers should encourage people with mild dehydration to drink fluids (e.g. water or diluted apple juice in children older than six months).**
- In more severe cases, first aid providers should rehydrate the person using either commercially prepared oral rehydration salts or a pre-prepared salt package that complies with the World Health Organization's recommendations for oral rehydration salts solutions.**
- First aid providers can use 4%–9% carbohydrate-electrolyte drinks to care for exertion-related dehydration. If these are not available or not tolerated, alternative beverages include water, 0%–3.9% carbohydrate-electrolyte solution, coconut water or 2% or low-fat milk.*
- Breastfeeding for babies should be continued.**

Good practice points

- Breastfed babies require more frequent feedings as they generally receive less milk each time they feed than bottle-fed babies. Breastfeeding can be supplemented with oral rehydration solution (ORS).
- If using formula, babies should receive normal amounts of milk (powder dissolved in water, NOT in ORS), SUPPLEMENTED with ORS.
- Emergency medical services (EMS) should be accessed if the person's responsiveness is altered (trouble waking up, confusion) or they become unresponsive.
- First aid providers should seek medical advice if they are in doubt, or if the person:
    - is a baby, child or older adult
    - loses more fluid than they take (e.g. severe vomiting)
    - urinates very little or not at all, and the urine is a dark colour
    - has a fever or signs of heat exhaustion.
- In cases of mild diarrhoea, other juices (e.g. guava or mango) can be used as an alternative to apple juice, or as an addition to ORS.

Chain of survival behaviours

Prevent and prepare

- In hot weather, regularly check on older adults and babies to ensure they remain cool and drink plenty of fluids.
- Ensure babies and young children continue to take breast or bottle milk (or other drinks) when they have fever or diarrhoea or are vomiting, as the risk of dehydration is high.
- Avoid doing any vigorous activity outside during the hottest part of the day.
- Train and acclimatize your body in the lead up to significant sports activity.
- In hot weather, dress appropriately, take frequent breaks in a shaded area, drink plenty of (cool) fluids and avoid activities that over-exert yourself.
- In cold weather, avoid overexertion that causes sweating or reduce the number of layers of clothing.
- Be aware that dehydration can occur in any weather, not just hot weather. It is important to stay hydrated in all situations.
- Carry plenty of fluids if travelling in remote areas with limited water supply.
- Practise good food and hand hygiene, and only consume clean (potable) water to avoid vomiting and diarrhoea (one of the main causes of dehydration).
- As the climate continues to warm, more extreme heat events are expected to occur in locations that are unprepared for the consequences of high temperatures. It is valuable to learn how to prepare for these changing climates.

Early recognition

The person may be in a hot environment, doing vigorous physical activity during a heatwave, or may not have adequate access to fluids.

The person may have:

- diarrhoea or vomiting
- fever
- altered responsiveness
- headache
- dizziness
- less or no sweat (e.g. under the armpits)
- absence of tears
- dark coloured urine
- weak radial pulse
- dry mouth and tongue
- delayed time to skin re-colouration
- abnormal breathing pattern
- fatigue (in the elderly).

In babies and young children look for:

- dry mouth and tongue
- crying without tears
- sunken eyes
- unusually tired or sleepy

- a dry diaper for three hours or more.

First aid steps

1. Reassure the person and give them plenty of fluids to drink.
    a. In mild cases of dehydration, water is sufficient.
    b. In more severe cases, give the person an oral rehydration solution (ORS). If this is unavailable, give the person apple juice, coconut water or water.

For children:

- Babies and young children who are breastfed should continue to be so. The frequency of feeding should be increased.
- Babies receiving milk formula should drink regular amounts of milk, supplemented with ORS. The formula should be dissolved in water, not in ORS, as the latter may cause diarrhoea and worsen dehydration further.
- Children between the ages of two and five years should have 10 ml/kg (the caregiver will need to estimate their weight) of water, rehydration solution, apple juice, coconut water or water.

- Any fluids given to the person should be non-alcoholic.
- To create one litre of ORS, combine:
    - half a teaspoon of salt
    - six teaspoons sugar
    - One litre of drinking water

DO NOT give an ORS to a person experiencing a diabetic hyper crisis as it could have severe negative effects and worsen dehydration further.

Access help

- Access EMS if the person's mental status changes (e.g. confusion) or they become unresponsive.
- Seek medical advice if:
    - the person's condition does not improve quickly
    - they are a baby, child or older adult
    - they are losing more fluid than they can take in (e.g. because of vomiting or diarrhoea)
    - they urinate very little or not at all and the urine is a dark colour
    - has fever or signs of heat exhaustion
    - you are in doubt.

Self-recovery

- To avoid a case of new dehydration, continue to drink fluids regularly. Eat fruit and vegetables regularly.

Education considerations

Context considerations

- Depending on the availability and access to potable (clean) water, you may need to include information on water sterilization methods (e.g. boiling or chlorination) and the risks of drinking contaminated water.
- Include information on the importance of drinking fluids which rehydrate the body, such as water and juice.
- Advocate for the use of breast milk for babies as a safe form of hydration which does not rely on potable (clean) water. If milk formula is the only available source of milk, emphasize the need for the water to be potable (clean) to avoid infections that cause vomiting and diarrhoea.

Learner considerations

- If facilitating a group of new parents, only include the content relevant to caring for a baby. Build learners' confidence in their ability to identify potential causes of dehydration in babies (fever, vomiting, diarrhoea, overdressing, etc.) and their ability to prevent and recognize it.
- If facilitating a group of learners who have caring responsibilities for older people, discuss the risks of dehydration and ways to reduce the risks.

Facilitation tips and tools

- Ask learners to identify those most at risk of dehydration in their own lives and how to help to prevent it.
- Help learners recognize that dehydration can also occur in cold settings when people wear too many layers or overexert themselves.
- Provide learners with visual, written or verbal information about how to recognize dehydration.
- Recommend that learners prepare for dehydration by having access to drinking water, and store-bought or home-made ORS.

Learning connections

- Explore this topic alongside Abdominal pain, vomiting and diarrhoea or Hyperthermia and make connections to the leading causes of dehydration.

Scientific foundation

Systematic reviews

The following evidence was reviewed by the Centre for Evidence-Based Practice (CEBaP) in 2020. In addition, evidence from the International Liaison Committee on Resuscitation (ILCOR) about the use of carbohydrate- electrolyte solutions is also cited.

Signs or symptoms

In a diagnostic evidence summary from CEBaP, updated in 2024, three systematic reviews were included.

There is limited evidence in favour of certain individual signs and symptoms to detect the presence or absence of dehydration. It was shown that a dry oral mucous membrane may be helpful to detect the presence, but not the absence, of dehydration.

The clinical helpfulness of prolonged capillary refill, decreased skin elasticity, increased heart rate, dry mouth, dry lips, being unable to spit, sunken eyes, dry axilla, headache, dizziness, fatigue, muscle weakness, thirst, dark coloured urine and urine voiding frequency to detect the presence or absence of dehydration, could not be demonstrated.

Evidence is of very low certainty and results cannot be considered precise due to low sample sizes, large variability in results and lack of data.

In addition, there is limited evidence in favour of using certain composite measures to detect the presence or absence of dehydration.

It was shown that using the Gorelick 4- and 10-items scales (measuring lack of tears, dry mucous membranes, poor overall appearance and delayed time to skin-recolouration) can be helpful in detecting the presence and absence of moderate (>5%) or severe (>10%) dehydration, respectively.

In addition, the Clinical Dehydration scale (measuring general appearance, degree of sinking of the eyes, degree of dryness of the tongue, presence or absence of tears) can be clinically helpful to detect the presence, but not the absence, of severe (>6%) dehydration.

The clinical helpfulness of the WHO dehydration scale to detect moderate (5–10%) to severe (>10%) dehydration could not be demonstrated.

Evidence is of very low certainty and results cannot be considered precise due to low sample sizes, large variability in results and lack of data.

Oral rehydration solution (commercial or home-made)

A 2016 evidence summary by CEBaP included one Cochrane systematic review. Since this review has been declared stable (new trials are unlikely to change its conclusions), this review and evidence summary have not been updated. A separate evidence summary about home-made oral rehydration solutions (ORS) was updated in 2024, and did not identify new studies.

The 17 studies included in the Cochrane systematic review showed no difference between using an ORS or intravenous therapy for treating dehydration due to gastroenteritis in children. Low-certainty evidence showed that oral rehydration therapy did not result in a statistically significant difference in weight gain, hyponatraemia or hypernatraemia, duration of diarrhoea or total fluid intake at six hours and 24 hours, compared to intravenous therapy. However, the use of oral rehydration therapy did result in a statistically significant decrease in length of hospital stay, but also resulted in a statistically significant failure to rehydrate, compared to intravenous therapy.

No studies were identified that compared the effectiveness of home-made (maize-based) ORS to that of standard (reduced osmolarity) ORS. However, one study was found about the feasibility of preparing maize and salt-based home-made ORS compared to glucose-based one. The study compared if ORS compositions were within safe ranges, with sodium levels between 51–120

mmol. It was shown that making maize and salt solutions resulted in a statistically significant decrease of solutions with too high sodium levels (higher than 120 mmol/l), and a statistically significant increase in making solutions with a safe composition (sodium levels between 51–120 mmol/l), compared to making a glucose-based ORS. A statistically significant increase of ORS with too low sodium levels (lower than 50 mmol/l), when making maize and salt ORSs compared to a glucose solution, could not be demonstrated. Evidence is of low certainty and results cannot be considered precise due to the low number of events and/or large variability of results.

Apple juice

There is limited evidence from one randomized controlled trial in favour of using diluted apple juice as the preferred fluids in children older than six months with mild gastroenteritis. It was shown that taking diluted apple juice (half-strength), followed by taking fluids of the child's preference, resulted in a statistically significantly decreased risk of treatment failure and intravenous fluid requirement in low-risk children without signs of dehydration, compared to an ORS. A statistically significant decreased risk of unscheduled healthcare visits, hospitalization, extended symptoms and rate of vomiting or diarrhoea, when using diluted apple juice and preferred fluids, compared to an ORS, could not be demonstrated. Evidence is of moderate certainty.

Another randomized controlled trial compared the use of apple juice following rehydration with ORS to the intake of water following rehydration with ORS. The trial evidence was in favour of drinking water. It was shown that intake of apple juice following rehydration with ORS, resulted in a statistically significantly increased duration of diarrhoea and amount of stool loss in children with mild dehydration, compared to water. A statistically significant increase in body weight when using an ORS and apple juice, compared to an ORS and water, could not be demonstrated. Evidence is of moderate certainty.

Breastfeeding

A 2020 evidence summary by CEBaP identified one randomized controlled trial and four case-control studies that provide limited evidence in favour of continuing breastfeeding in case of dehydration. Studies showed that stopping breastfeeding resulted in a statistically significant increased risk of dehydrating diarrhoea or increased risk of diarrhoea evolving to dehydration. Evidence is of very low certainty and results cannot be considered precise due to lack of data.

There is moderate-certainty evidence from one randomized controlled trial in favour of the combination of providing an ORS and breastfeeding. This combination resulted in a statistically significant decrease in the number of times stools were passed in hospital and in the total volume of ORS required for rehydration, compared to giving ORS only. However, this study could not demonstrate a statistically significant decrease in stool output, vomitus volume and duration of diarrhoea when giving the combination of ORS and breastfeeding.

The evidence summary was not updated further as the evidence was declared stable.

Oral carbohydrate-electrolyte solutions

In 2022, ILCOR updated the systematic review on the use of carbohydrate-electrolyte solutions and alternative beverages for people with exertion-related dehydration (Wyckoff et al., 2021; Wyckoff et al., 2022a; De Brier et al., 2023; Borra et al., 2023).

The systematic review was published in two parts; the first part reviewed the effectiveness of carbohydrate-electrolyte (CE) solutions, commonly referred to as sports drinks. The second part reviewed alternative beverages such as milk, coconut water and beer. The review included 20 studies that assessed CE solutions (0%–9% carbohydrate) and 11 studies comparing skim or low-fat milk, coconut water and beer (0–5% alcohol) with water. A potential beneficial effect from ingesting CE drinks when compared with water for many of the reviewed outcomes was found. In addition, consuming skim or low-fat cow's milk without additional food appeared to improve volume/hydration status, compared to water. No significant differences were found with coconut water (compared to water), and there was insufficient evidence to recommend beer (0%–5% alcohol) for rehydration.

Based on the evidence, ILCOR suggests the use of commercial CE drinks (ideally 4–9%) for rehydration in situations of exertion related dehydration. Alternative rehydration options include 0%–3.9% CE drinks, water, coconut water, or skim or low-fat cow's milk. There is insufficient evidence to recommend for or against rehydration with beer (0%–5% alcohol).

In 2024 ILCOR conducted an evidence update, and two additional randomized controlled trials were identified. However these did not contain sufficient data to warrant a full systematic review update (Greif et al., 2024a; Greif et al, 2024b).

Hypothermia

Key action

Gradually warm the person using the most appropriate equipment available.

Introduction

Hypothermia is a condition in which the body's core temperature drops below 35°C (95°F) and cannot function properly; blood circulation reduces significantly, especially in the small vessels in the skin. It can occur when a person is exposed to extreme cold, such as in mountainous regions in the winter. Other factors that intensify the risk of hypothermia are living in homes that lack heating, the use of alcohol or substances or pre-existing mental health conditions (Gordon et al., 2014). Some conditions reduce people's ability to recognize when they have lost a significant amount of heat.

Guidelines

- If the person has stopped shivering, the first aid provider should actively warm them, preferably using an electric heating blanket. Hot water bottles, heating pads or warm stones may be used as alternatives.*

Good practice points

- People experiencing hypothermia should be treated with care, removed from the cold source and have any wet clothes removed. If the person is moderately to severely hypothermic, clothes should be cut off to minimize their movement as this could lead to dangerous heart arrhythmias.
- A person experiencing hypothermia, who is responsive and shivering vigorously, may be warmed passively (e.g. using a sleeping bag, a fleece or a 100% polyester blanket, with a wind or vapour barrier). The head and body should be covered to minimize convective and evaporative heat loss. Alternative equipment may be used, including warm, dry clothing or reflective material. The person should contract and relax large muscles to generate internal heat.
- Do NOT apply warm stones directly to the skin to avoid burning the person. Do NOT rub the person's skin, as this may damage the skin and underlying muscles.
- Care should then be taken to insulate the person by placing a barrier between them and the ground (e.g. a tarp and sleeping bag) to minimize conductive heat loss.
- If the person is responsive and able to swallow, the first aid provider should give them a warm sugary drink (e.g. hot chocolate) or some high-energy food.
- For all cases of hypothermia, emergency medical services (EMS) or equivalent should be accessed and the person's airway, breathing and circulation should be monitored.

Chain of survival behaviours

Prevent and prepare

- Wear appropriate cold-weather clothing.
- Keep clothing dry. If clothing gets wet, change into dry clothing as soon as possible.
- In cold weather, check on those in insecure housing or without heating to ensure they have ways to keep themselves warm.
- Eat high-energy foods and drink high-calorie drinks, as well as water, to prevent dehydration.
- Avoid alcohol.
- If possible, take regular breaks from the cold to allow the body to warm up.
- When planning to visit a remote, cold area, check how to access local emergency services and take appropriate signals and contact details with you.
- Ensure someone knows when you are venturing to a remote place, the route you plan to take and when you expect to return.

Early recognition

Symptoms will depend on the temperature and whether the person is experiencing mild or severe hypothermia. Take into account the surrounding environment, for example, if the person is in a cold environment or wearing wet clothing, they are at a higher risk of hypothermia.

The person may have the following:

- shivering
- poor coordination
- slow movements
- mild confusion
- skin becomes paler, ashen or loses its colour
- bluish colouring to lips, ears, fingers and toes.

As their condition worsens, they may show the following:

- no shivering
- disorientation, lack of memory
- exposed skin becomes blue and swollen
- may become incoherent or behave irrationally
- coordination continues to worsen; the person cannot walk or use their hands.

First aid steps

1. Remove the person from the cold or protect them from further cooling.
2. Have the person remove any wet clothes (or help them if they are unable to do so). Carefully dry off the person if they are wet. Cover and protect the person from the cold.
3. If a person is responsive and shivering, let them warm up using a sleeping bag or a blanket. If they can swallow, give them a warm, sugary drink (e.g. hot chocolate) or some high-energy food.
4. If the person is in an altered state of responsiveness and is not shivering, gradually warm them using an electric heating blanket. Hot water bottles, heating pads or warm stones

can be used as alternatives. Be sure there is a layer between the item and the skin to prevent burns.

5. Reassure the person and monitor their breathing and level of response.

CAUTION

- Do not rub the person's skin, as this may damage it and the underlying muscles further.
- Do not apply warm stones directly to the skin as this may burn the person.

- If the person becomes unresponsive, open their airway and check for breathing. See Unresponsiveness.
- In a limited-resource setting, create a heat source (such as a campfire) to warm the person and build a shelter to protect them from the cold. Ensure there is a layer, such as a blanket, between the person and the ground.

Access help

For all cases of hypothermia, the first aid provider should access emergency medical care immediately.

Recovery

Most healthy people with mild to moderate hypothermia will recover fully. However, if signs and symptoms continue or additional ones appear, seek medical care.

Education considerations

Context considerations

- Learners in or visiting cold climates may benefit from learning how to prevent hypothermia and frostbite (including winter conditions in any setting, and specific settings such as the mountains).
- CPR in a hypothermic person will be prolonged.
- Include information on accessing help in rural or remote environments.
- Programme designers should consider that hypothermia can also occur in the home (e.g. older people who are unable or choose not to turn on the heat in cold weather, or people who slip on icy steps and cannot help themselves up).
- Hypothermia can even occur in warm temperatures if a person is wet and inactive.
- In some contexts, learners may benefit from learning about reducing the risk of experiencing an avalanche, including familiarization with local avalanche warning signs and safe behaviours to follow (e.g. avoid closed ski slopes).

Facilitation tips

- Make learning contextual; facilitating a session outside in cold conditions can reinforce the reality of what a learner may experience in this type of emergency.
- Plan to include environmental conditions at the end of a session as this will allow you to integrate other first aid education (e.g. preventive actions to take or additional symptoms to look for when in a cold environment).
- Recommend individuals review any medication with their healthcare provider as some medical conditions and medications affect the body's ability to regulate its temperature.

Facilitation tools

Scenarios or games can be used to reinforce key learning points, such as a focus on early recognition. For example:

- Divide learners into small groups and set the scene (e.g. going on an overnight hiking trip). Ask them to write a list of what they will take and what they must do to prepare as a group.
- Add in a complication such as a change in the weather or the group must cross a river and the water is cold.
- Encourage the group to assess what is happening and decide what they will do. Refer them back to their equipment and preparation lists.
- You can also include complications that allow learners to use other first aid skills. For example, one of the group members sprains their ankle and cannot walk on it. Now learners must provide care for the ankle, decide how they will prevent the person from getting hypothermia and determine how they will evacuate the area.

Learning connections

- In some contexts, this topic could be combined with Frostbite.
- Communicate that hypothermia can occur as a result of cooling a burn. First aid providers should focus their cooling efforts on the burn site (rather than the entire body) and monitor the person during the cooling process.

Scientific foundation

Systematic reviews

The Centre of Evidence-Based Practice (CEBaP) updated its evidence summary on active rewarming techniques in 2024. No new studies were identified.

Heating pads

There is limited evidence from one non-randomized controlled (within-subject) trial that did not demonstrate a statistically significant decrease in rectal or tympanic afterdrop or the length of rectal or tympanic afterdrop when using heating pads compared to shivering only. Evidence is of low to very low certainty and results cannot be considered precise due to limited sample size and lack of data.

Electric blanket

There is evidence from two randomized controlled trials in favour of using an electric blanket. It was shown that using an electric blanket resulted in a statistically significant increase in rewarming rate, thermal comfort and satisfaction with their care, as well as a statistically significant decrease in pain scores, shivering and anxiety levels, compared to a blanket alone. However, in the smallest of the two studies, a statistically significant decrease in shivering using an electric blanket compared to a blanket alone, could not be demonstrated. Evidence is of moderate certainty.

Warm water (45°C) vs. warm water (42°C)

There is inconclusive evidence from two randomized and one non-randomized controlled trials concerning the immersion of arms and legs (only) in warm water (42°C or 45°C) compared to using a blanket or an insulated bag. Evidence is of low to very low certainty and results cannot be considered precise due to limited sample size and lack of data.

Warm water immersion (extremities only)

There is limited evidence from one non-randomized controlled trial in favour of immersing only the arms and legs in warm water at 45°C compared to warm water at 42°C. Evidence is of low certainty and results cannot be considered precise due to limited sample size. It was shown that warm water immersion at 45°C resulted in a statistically significant decrease in the length of oesophageal afterdrop and in a statistically significant increase in oesophageal rewarming rate, compared to warm water immersion at 42°C. A statistically significant decrease in oesophageal afterdrop, using warm water immersion at 45°C compared to at 42°C, could not be demonstrated.

Warm water immersion (excluding extremities)

There is limited evidence from two randomized and two non-randomized controlled trials in favour of immersing the whole body, excluding the head, arms and legs, in warm water.

It was shown that warm water immersion resulted in a statistically significant increase in rewarming rate and a statistically significant decrease in rectal afterdrop and length of afterdrop, compared to a blanket. However, a statistically significant difference in oesophageal afterdrop could not be demonstrated when comparing warm water immersion to using a blanket.

In addition, it was shown that warm water immersion resulted in a statistically significant increase of (maximum) rewarming rate and a statistically significant decrease of the rectal afterdrop, the length of afterdrop and the time from the start of rewarming to the cessation of shivering, compared to an insulated bag. However, a statistically significant difference in rewarming rate, tympanic afterdrop and tympanic length of afterdrop could not be demonstrated when comparing warm water immersion to using an insulated bag. Evidence is of very low certainty and results cannot be considered precise due to limited sample size, lack of data and large variability of results.

Warm water immersion (whole body)

There is limited evidence in favour of immersing the whole body, excluding the head, in warm water, compared to shivering only or using a blanket.

When compared to shivering only, whole-body immersion in warm water resulted in a statistically significant increase in thermal (comfort) sensation and a statistically significant decrease in shivering sensation, reaction time and length of tympanic afterdrop. Conversely, a statistically significant difference in tympanic afterdrop, rectal afterdrop or length of rectal afterdrop, when using warm water immersion of the whole body compared to shivering only, could not be demonstrated.

When compared to using a blanket (+ vapour barrier), it was shown that warm water immersion of the whole body resulted in a statistically significant decrease in (oesophageal, rectal and tympanic) afterdrop and length of (oesophageal, rectal and tympanic) afterdrop, and a statistically significant increase in (oesophageal, rectal and tympanic) rewarming rates. However, another study could not demonstrate that immersing the whole body in warm water resulted in a statistically significant difference in oesophageal and rectal afterdrop, compared to using a blanket with a vapour barrier.

When compared to using heating pads, a statistically significant difference in rectal and tympanic afterdrop temperatures and rectal and tympanic afterdrop lengths could not be demonstrated using whole-body warm water immersion. The evidence is of low certainty and results cannot be considered precise due to limited sample size and lack of data.

Warm water immersion (excluding extremities) vs. warm water immersion (extremities only)

There is limited evidence from one randomized controlled trial in favour of immersing the whole body in warm water, excluding the head, arms and legs, compared to warm water immersion of only the extremities. Evidence is of low certainty and results cannot be considered precise due to limited sample size.

Warm water immersion (whole body) vs. warm water immersion (extremities only)

There is limited evidence from one randomized controlled trial in favour of immersing the whole body in warm water, excluding the head, compared to immersing extremities only. The evidence is of low certainty and results cannot be considered precise due to limited sample size.

Warm water immersion (whole body) vs. warm water immersion (excluding extremities)

There is limited evidence from two randomized controlled trials in favour of immersing the whole body in warm water, excluding the head, compared to immersing the body without extremities. Evidence is of low to very low certainty and results cannot be considered precise due to limited sample size.

Frostbite

Key action

Gently immerse the affected area in warm water until it is rewarmed (usually 30 minutes) and protect it from cold.

Introduction

Frostbite is damage to the skin and other tissues caused by extreme cold. When it is cold (at or below 0°C) or there are strong winds, the human body tries to preserve its core body temperature by constricting the blood vessels near the skin. In extreme cases, this can reduce the blood flow in some areas of the body to dangerously low levels, resulting in frostbite. The fingers and toes are the most vulnerable. Frostbite can lead to permanent damage, but this can be avoided if it is recognized and treated quickly.

Good practice points

- Warming of frozen body parts should be done only if the appropriate resources are available, medical care is more than two hours away and there is no risk of refreezing.
- Warming should be achieved by immersing the affected area in warm water between 37°C and 39°C (98.6°F and 102°F) until the affected body part takes on a red or purple appearance and becomes soft and pliable to the touch (usually in 30 minutes).
- Other heat sources (e.g. fire, space heater, oven, heated rocks) should be avoided because of the risk of burns.
- During warming, consider giving the person a high dose of ibuprofen (400-800 mg) or, if unavailable, a low dose of acetylsalicylic acid (75-81mg). This may improve healing.
- After warming, the frostbitten area should be protected from refreezing and the person should seek medical care as soon as possible.
- Topical aloe vera may be applied to the frostbite after re-warming.
- Affected body parts should be dressed in sterile gauze until the person can access medical care. If fingers or toes are affected, the gauze should be placed between them.

Chain of survival behaviours

Prevent and prepare

- Ensure feet, hands and face are kept warm and covered in cold conditions.
- Pack appropriate equipment and clothing for the weather conditions, including emergency items in case conditions worsen.
- Take shelter from extreme cold or strong cold winds.
- Be aware that cold temperatures numb the nerves in the skin and reduce sensitivity. This makes it more challenging to notice when frostbite occurs.
- Be aware that with humidity and wind, frostbite can occur at temperatures as high as 5°C and 7°C.
- Be aware that metal items (e.g. glasses or jewellery) can cause the skin to suddenly freeze when exposed to cold, damp wind, especially if the skin the metal touches is sweaty.

Early recognition

- Early frostbite may be marked by flushed skin, sensation changes such as burning, prickling or numbness, or pain in the exposed cold area. The skin flushing can decrease as the skin cools, and it can appear paler from decreased blood flow. Skin becomes cold, hard to the touch, waxy and blisters can form. As frostbite progresses, the skin dies and turns dark blue or black.

First aid steps

1. Protect the person from hypothermia. Do this by helping them move to a warmer place, removing wet clothing and keeping them warm and dry.
2. Carefully remove jewellery if this is possible without causing any damage to the skin.
3. Gently warm the affected area by putting it in warm (body temperature) water until it is rewarmed (usually 30 minutes). Avoid rubbing or aggressively handling the affected area as this may damage the skin.
4. Dress the affected area with sterile gauze. If multiple digits are affected, place gauze between each digit.
5. Consider giving the person a high dose of ibuprofen (400-800 mg) or, if unavailable, a low dose of acetylsalicylic acid (75-81mg). This may improve healing.

CAUTION

- Rewarm the frostbitten area if you have appropriate resources, there is no risk of refreezing and you can rewarm the part faster than if they access medical care.
- Do not put the affected area near direct heat like a space heater or hot stove.
- Avoid breaking blisters that may occur.

Access help

- Always access medical care in the case of frostbite.

Education considerations

Context considerations

- It may be useful to explore preparedness and safe behaviours in very cold climates relevant to the learners, for example, being stuck somewhere remote with a broken-down vehicle in winter, working in wilderness areas or doing winter sports such as skiing.
- Consider covering this topic with learners who are more vulnerable, such as elderly people, unhoused individuals, and migrant and refugee groups.
- Consider covering this topic with nomadic communities, such as herders, as they are at risk of frostbite while caring for livestock and facing harsh environmental conditions.

Facilitation tips and tools

- As frostbite is relatively uncommon, help learners recognize it by including images in your education material.
- Help learners identify how they would get medical help in an emergency in the extreme cold.

Learning connections

- A person with frostbite may also be experiencing Hypothermia.

Scientific foundation

Systematic review

An evidence summary by the Centre for Evidence-Based Practice (CEBaP) on active warming for frostbite identified one retrospective cohort study; however, an increase in limb salvage in cases of rapid rewarming by placing affected digits or extremities in a warm water bath could not be demonstrated.

Non-systematic review

While conducting the evidence summary on active warming for frostbite, CEBaP identified the recently updated guidelines from the Wilderness Medical Society on the prevention and management of frostbite (McIntosh et al., 2019). These guidelines are based on case series and animal studies and contain some recommendations:

- Field rewarming by warm water bath immersion can and should be performed if the proper resources are available and medical care is more than two hours distant. Other heat sources (e.g., fire, space heater, oven, heated rocks) should be avoided because of the risk of thermal burn injury.
- Rapid rewarming by water bath has been shown to yield better outcomes than slow rewarming.
- Field rewarming should only be undertaken if the frozen part can be kept thawed and warm until the person arrives at medical care. The water should be heated to 37° to 39°C. Circulating the water around the frozen tissue will help maintain the correct temperature.

Use of medication

Low-dose acetylsalicylic acid (75-81 mg) and high-dose ibuprofen (400-800 mg) appear to be associated with improved healing, although data are poor. However, the risk of adverse reactions to acetylsalicylic acid and ibuprofen is very low, and providing these medications may be considered for significant frostbite(Heggers et al., 1987; McIntosh et al., 2019) .

Aloe vera

There is limited evidence, but topical aloe vera may be beneficial when applied to the frostbite (Heggers et al., 1987; McCauley et al., 1983; McIntosh et al., 2019).

Altitude sickness

Key action

Take the person to a lower altitude as quickly and safely as possible.

Introduction

Altitude sickness occurs when people at a high altitude do not have enough oxygen in their blood because the air pressure is too low. As altitude increases, the air becomes thinner and less oxygen is inhaled with each breath. The term altitude sickness includes:

- Acute mountain sickness (AMS)
- High altitude pulmonary edema (HAPE), affecting the lungs and breathing
- High altitude cerebral edema (HACE), affecting the brain, behaviour and alertness.

Individuals most affected by altitude sicknesses are those who travel to a high altitude quickly (e.g. tourists), especially if they have pre-existing medical conditions. However, trained mountaineers can also develop symptoms when they reach very high altitudes, such as in the Himalayan region.

Guidelines

- People experiencing AMS, HACE or HAPE should stop their ascent immediately and start to descend safely, with support, until their symptoms lessen.**
- If the person has prescribed medication for altitude sickness with them (such as acetazolamide or dexamethasone), the first aid provider may assist them in taking it based on the label instructions.*
- Where local laws, regulations, or protocols permit, specially trained first aid providers may give medications (such as acetazolamide or dexamethasone) to individuals experiencing altitude sickness.*
- For first aid providers trained in its use, oxygen may be administered to individuals experiencing AMS, HACE or HAPE.*

Good practice points

- People experiencing altitude sickness should be kept from getting cold or overheated.
- Gradual or staged ascent to higher altitudes may be a more effective method of prevention than a fast ascent.
- Adequate hydration should be maintained (though not forced). The person should drink regularly (every 20–30 minutes) and enough (more than they would normally drink).

Chain of survival behaviours

Prevent and prepare

- Check how to access local emergency services and pack appropriate signals and contact details when going to high altitudes.

- Ensure you have the right equipment with you to make a safe descent.
- Eat high-energy foods and drink high-calorie drinks, as well as water, to prevent dehydration.
- Ensure someone knows the route you plan to take if you are venturing to a remote place, and when you expect to return.
- Avoid alcohol.

Early recognition

People may start to experience symptoms at around 2,400 m (roughly 8,000 feet). Twenty-five per cent of travellers experience AMS above 3,500 m (11,483 feet), with 50% experiencing it above 6,000 m (19,685 feet). Be aware of the signs of altitude sickness if travelling above this altitude (Hackett & Shlim, 2019).

Several altitude sickness diagnostic-scoring systems exist. The Lake Louise Criteria for Altitude Sickness (Roach et al., 2018) are as follows:

Acute mountain sickness

If the person chooses to remain at a certain altitude, AMS may improve with rest, hydration and medication. However, the symptoms will improve faster by descending to a lower altitude. There is also the risk that AMS will progress to HAPE or HACE.

- Headache and at least one of the following symptoms: fatigue or weakness; dizziness or light-headedness; gastrointestinal symptoms (nausea or vomiting, loss of appetite); difficulty sleeping; shortness of breath.

High-altitude pulmonary edema

HAPE is when fluid collects in the lungs (pulmonary edema) and causes extreme shortness of breath. It is life-threatening and requires immediate, safe descent.

- At least two of the following symptoms: difficulty breathing while resting; coughing; weakness or decreased physical performance; chest tightness or congestion.
- At least two of the following signs: crackling or wheezing heard in one or both lungs when breathing; bluish colouring to the skin, lips and fingers; rapid breathing and elevated heart rate.

High-altitude cerebral edema

HACE is when fluid collects on the brain, causing confusion, coma, and, if untreated, death. It is life-threatening and requires immediate, safe descent.

- Change in responsiveness, behaviour, normal movement or coordination in a person, either with or without acute mountain sickness.

First aid steps

1. Help the person move to a lower altitude as quickly and safely as possible. Encourage them to drink water.
2. If the person has prescribed medication for altitude sickness, help them take it.

3. Have the person rest at a lower altitude until their symptoms resolve. If local regulations permit, and you are trained to do so, administer oxygen to the person. You may do this upon arrival at a lower altitude, or if necessary, while descending with the person.
4. Access emergency medical services (EMS) if the person's condition does not improve.

Monitor the person's temperature to ensure they do not get too cold or hot. See hypothermia or Hyperthermia.

Access help

- Access help if the person is unable to descend on their own and it is unsafe for other group members to transport them to a lower altitude. Help may take many forms, including other hikers, search and rescue, formal evacuation teams or military assistance.
- Access EMS if the person's condition does not improve.

Recovery

- If a person with AMS is asymptomatic, they may continue to ascend. They should monitor themselves for signs and symptoms of AMS, HAPE and HACE.
- Once descended to a lower altitude, a person with HAPE or HACE should not re-ascend until their symptoms have resolved and they have been examined by a medical professional.

Education considerations

Context considerations

- Altitude sickness can affect a variety of groups, including hikers, climbers, seasonal employees and tourists. There are many towns and cities worldwide that are located at high altitudes. We advise first aid programme developers to work with local authorities and tour companies to publicly display educational materials informing people of the signs and symptoms, the importance of staying hydrated and how to get help.
- Due to the remote nature of HACE and its impact on decision-making, it is crucial to educate and monitor the group for signs and symptoms, as poor decisions could lead to further safety issues.
- Refer to local guidelines and include any context-specific information in the programme.
- Engage local medical experts, mountain rescue groups and tour operators when developing content for this topic.
- Follow local laws and regulations concerning helping people with prescribed medications and administering oxygen.
- Use posters and other media in high altitude areas with tourists to raise their awareness of altitude sickness.

Facilitation tips

- Emphasize how to prevent and recognize the symptoms of altitude sicknesses, as often, the person affected may not realize they have it.
- Use visual materials (pictures and videos) to illustrate signs and symptoms of the different types of illness that high altitudes can incur.

Learning connections

- Being at high altitudes can cause someone to feel faint; make connections to Feeling faint.
- Symptoms of AMS may appear similar to those of Dehydration.

Scientific foundation

Systematic review

In 2020, the Centre for Evidence-Based Practice (CEBaP) developed an evidence summary on the practice of descending when someone is experiencing altitude sickness, as well as a summary on drinking adequate amounts of water as a protective factor against altitude sickness. The evidence in these summaries was declared stable and the summaries were not updated in 2024. A Cochrane systematic review looked at pharmacological interventions for altitude sickness, including oxygen provision.

Descent

One study showed that a descent to 193mbar (equivalent to a descent of 2,250 m or 7,382 feet) resulted in a statistically significant decrease in the clinical score of mountain sickness and AMS cerebral score immediately after treatment, compared to resting at ambient pressure (i.e. not descending). In addition, this study showed that a pressure of 20mbar (equivalent to descending 250 m or 820 feet) resulted in a statistically significant decrease in the AMS cerebral score immediately after treatment, compared to resting at ambient pressure (i.e. not descending). However, the study could not demonstrate a statistically significant decrease in the clinical score and AMS cerebral score 12 hours after descending 193 or 20mbar. The evidence is of very low certainty, and results cannot be considered precise due to limited sample size and lack of data.

Oxygen

The Cochrane systematic review identified one small study with 13 participants that examined the use of oxygen (Simancas-Racines et al., 2018). The low-quality study describes the improvement in AMS with the use of three litres of oxygen per minute for 10 minutes. It found that treatment with oxygen significantly improved the symptoms of AMS and improved the person's oxygenation.

Other medication interventions

The Cochrane systematic review also identified studies on the use of medicines to relieve the symptoms of AMS. Studies related to the administration of medicines have found some benefits in terms of symptom reduction with the use of acetazolamide (two studies, 25 participants, low-certainty evidence) and dexamethasone (one study, 35 participants, moderate-certainty evidence), without an increase in side effects. The effects from two additional trials comparing gabapentin with placebo and magnesium with placebo on symptom severity at the end of treatment were uncertain (low-certainty evidence).

Hydration

Five observational studies were identified that examined the risks or protective factors for AMS, including water intake. A statistically significant increased risk of AMS associated with low water intake compared to higher water intake could not be demonstrated in three studies, including two studies that conducted a multivariate analysis. Two other studies did find a significantly increased risk of AMS in cases of low water intake compared to high water intake; however, these studies did not correct for confounding factors in a multivariate analysis. The evidence is of very low certainty and results cannot be considered precise due to limited sample size or a low number of events and lack of data.

Non-systematic review

Based on a small randomized controlled trial with 34 healthy mountaineers, gradual ascent to higher altitudes seemed a more effective method of prevention than a fast ascent (Bloch et al., 2009).

Decompression illness

Key action

Access emergency medical services (EMS) immediately and administer oxygen if specifically trained.

Introduction

Decompression illness results from a reduction in the ambient pressure surrounding a person's body. It is commonly caused by pressure changes that occur in scuba diving, a very popular sport in many parts of the world. Decompression illness includes two conditions: decompression sickness and arterial gas embolism. Decompression sickness is thought to result from bubbles growing in the tissue and causing local damage. Arterial gas embolism results from bubbles entering the circulation, collecting together and travelling through the arteries and causing tissue damage by blocking blood flow to the small vessels.

Good practice points

- In the case of suspected decompression illness, specifically trained first aid providers should administer oxygen at the highest concentration available (such as a non-rebreather mask), which may reduce the symptoms substantially. The oxygen should be continued until medical care is accessed.
- First aid providers should access EMS immediately, as well as the Divers Alert Network (see Access help section below) and indicate the likelihood of decompression illness so that transport of the person to a recompression chamber can be arranged as soon as possible. Definitive treatment is usually oxygen therapy provided in a recompression chamber.
- In cases of cardiac arrest after resurfacing, CPR should be administered with rescue breaths.
- In locations requiring extended or complicated transport to a recompression chamber, rapid transport to a nearby emergency department capable of resuscitation should be prioritized for stabilization prior to transport to the chamber.

Chain of survival behaviours

Prevent and prepare

- Be aware of and actively reduce the risk factors, including deep or long dives, cold water, hard exercise at depth and rapid ascents.

Early recognition

Symptoms of decompression illnesses usually appear 15 minutes to 12 hours after surfacing, but in severe cases, may appear before surfacing or immediately afterwards.

Decompression sickness

Symptoms include the following:

- unusual fatigue
- skin itch
- pain in joints and muscles of the arms, legs or body
- dizziness, vertigo, ringing in the ears
- numbness, tingling, paralysis
- shortness of breath.

Arterial gas embolism

Symptoms include the following:

- dizziness
- chest pain
- disorientation
- bloody froth from the mouth or nose
- paralysis or weakness
- convulsions
- becoming unresponsive.

First aid steps

1. If specifically trained, administer oxygen to the person.
2. Access EMS. If possible, call the Divers Alert Network +1-919-684-9111.
3. Monitor the person's level of response, breathing and circulation until EMS arrives.

- If the person becomes unresponsive, open their airway and check for breathing.
- If the person becomes unresponsive with abnormal breathing after resurfacing, CPR should be administered with rescue breaths.

Access help

- Phone EMS immediately. They will be able to tell you what to do and arrange help.
- The Divers Alert Network is an international not-for-profit organization with a helpline which can be reached 365 days a year, 24 hours a day, by phone: +1-919-684-9111. This network provides assistance with managing injured scuba divers, helps determine if recompression is needed, provides the location of the closest appropriate recompression facility and helps arrange transport for the person.

Education considerations

Context considerations

- In some countries, laws make it mandatory for professional diving operations to have oxygen readily available (e.g. diving training institutions). Therefore, the likelihood of oxygen being available is high at dive sites, and it is likely to be immediately available if called for by the first aid provider.
- Learners should be informed about any national first aid guidelines for decompression illness, including the local procedures for care in the country where they are diving.

- Programme designers should obtain information on local resources for diving emergencies and access to hyperbaric oxygen therapy facilities, and include this information in their programmes.
- Decompression-related injuries can happen in open water as well as in deep swimming pools, so education on this topic may be applicable to learners without local access to open water.

Learner considerations

- This topic is typically targeted at professional responders (e.g. paramedics, lifeguards) who have a specific duty to respond, possess strong assessment skills and have access to resources such as oxygen. Consideration should be given to the technical nature of this topic and the programme designer should match the content to the skill level of the learners using appropriate terminology.

Facilitation tips

- Explain that decompression sickness is the result of rapid decompression after exposure to increased pressure. During a dive, the body tissues absorb nitrogen from breathing gas in proportion to the surrounding pressure (which is elevated during diving). As long as the diver remains at pressure, the gas presents no problem. But if the pressure is reduced too quickly, the nitrogen comes out of solution and forms bubbles in the tissues and bloodstream. Diving tables provide scientific protocols for safe decompression, minimizing the risk of forming bubbles. However, decompression sickness can still occur despite following accepted guidelines.
- Explain that an arterial gas embolism happens if a scuba diver surfaces without exhaling. Air trapped in the lungs expands during ascent and may rupture lung tissue (known as pulmonary barotrauma), releasing gas bubbles into the arterial circulation. The bubbles are distributed and may impair the circulation wherever they become lodged. Because the brain receives the highest proportion of blood flow, it is the main organ where bubbles lodged in small arteries can interfere with circulation.
- Emphasize that if learners will be responding to suspected decompression illness hours after the person has resurfaced (and is presumably in a different environment), they will need to use a detailed assessment process to identify the symptoms as being related to decompression illness and not another condition.
- This topic is best suited to be covered after foundational concepts of first aid so that learners are able to draw from a range of skills and knowledge.

Facilitation tools

- National Societies may contact the Global First Aid Reference Centre for water rescue and drowning prevention first aid training programmes.
- There is an opportunity in this topic to include critical thinking and application of learning:
    - Option 1: Explore using a scenario and role play. This allows the learners to experience the varied roles among a team when responding and preparing for transport, exercise decision-making, practise their communication skills, and apply first aid skills.

- Option 2: Explore this topic using case-based learning. Ask learners to create their own case study (and then have a peer review it) or solve a case study that has already been developed.
- Using either method, you can further challenge the learners by extending the scenarios or cases over time so that they are required to identify the impact of time on the ill person's condition or add constraints which may require them to change their first aid action plan.

Learning connections

- Connect this topic to safety for the ill person and the first aid provider, assessment of the person (initial and continual), and accessing further support.
- Explore the safe administration and handling of oxygen.
- There is the potential that this condition will result in cardiac arrest

Scientific foundation

No formal reviews were made on this topic since people with decompression illness should be transported to EMS as soon as possible, and there are no other relevant first aid interventions.

Non-systematic review

The Divers Alert Network, a specialized medical network focused on diving-related problems, was a source of Good practice points presented in these guidelines.

A large retrospective case study showed that scuba divers experiencing decompression injury require less recompression treatment and have a greater likelihood of complete recovery if first aid includes normobaric oxygen (Blatteau et al., 2010).

Motion sickness

Key action

Stop travelling if possible to allow the person time to recover and take corrective action.

Introduction

Motion sickness is caused when the brain's estimate of motion is different from what the person is experiencing. The person's eyes, balance centre of the inner ear, and general perception of their body's position and movement conflict with the messages the brain receives. The sensitivity to motion sickness varies in individuals, but most people will experience it if the cause is strong enough. Pregnant women, children older than two years and those with migraines are most susceptible. First aid care is often ineffective, and providers should emphasize prevention instead.

Guidelines

- Eating a light meal, taking a dose of ginger, or chewing peppermints or ginger gum before travelling may help prevent motion sickness.*
- Controlled breathing and distracting the ill person with an activity (e.g. listening to music) may help to reduce symptoms of motion sickness.*
- Looking straight ahead through the windshield, keeping the eyes open, looking outside and fixing the gaze on a central point on the horizon, as well as restricting one's view, may help prevent motion sickness. Sitting in a chair with a high backrest, facing in the direction of travel, wearing an acustimulation wristband and having control over the movement of the vehicle (driving oneself) may also help prevent motion sickness.*

Good practice points

- Stopping the means of transport may decrease nausea.
- Getting fresh air during travel, with a window open and air on the face, may reduce symptoms of motion sickness.
- Those who have used medications such as antihistamines to relieve motion sickness previously should continue to use them if they are found to be effective.

Chain of survival behaviours

Prevent and prepare

The following methods may help prevent motion sickness:

- Eat a light meal before travelling.
- Drive the vehicle yourself, if possible.
- Take one to two grams of ginger (e.g. tea or biscuits) before or during travel.
- Sit in a chair with a high backrest during travel, facing forward.
- Look outside and fix the gaze on a central point on the horizon.
- Wear a P6 acupressure or P6 acustimulation wristband while travelling.

Additionally, some may find it helpful to:

- take mint or peppermint before or during travel
- sleep through travel
- get fresh air during travel.

Early recognition

Initially, the person's skin may become pale or ashen.

The person may feel dizzy or have a headache.

As symptoms progress, the person may experience nausea or vomiting.

First aid steps

1. Stop travelling if possible, to allow the person time to recover and take corrective action.
2. If it is not possible to stop travelling, tell the person to face forward and to look straight ahead at a fixed point on the horizon.
3. If possible, provide fresh air and encourage the person to take slow and regular breaths.
4. Try to distract the person (e.g. play some music).

Access help

Usually, motion sickness passes without the need to access help.

Education considerations

Context considerations

- Include the types of transport and related first aid care that are relevant to learners and their environment.
- Some areas may have safety considerations that do not allow vehicles to stop. First aid education should acknowledge and discuss these considerations in a learning activity.

Learner considerations

- People who travel with children (teachers, parents, coach drivers) may find it useful to learn about motion sickness.

Facilitation tips

- Focus on prevention in this topic as first aid is limited in its effectiveness and people may react differently to the various preventive suggestions.
- Ask the learners about their experiences with motion sickness, as this will help establish relevant context.
- Inform learners that people who take certain medications (e.g. antidepressants, asthma medications and even ibuprofen) may be more susceptible to motion sickness. Also inform them that certain medications (e.g. antihistamines) may cause drowsiness and impair the reflexes necessary for safe driving.

Scientific foundation

Systematic reviews

The Centre for Evidence-Based Practice (CEBaP) developed evidence summaries on the use of controlled breathing and travel activities for motion sickness, as well as on several preventive interventions. All summaries were updated in 2024 and added three additional randomized controlled trials and two non-randomized controlled trials.

First aid care

Controlled breathing

There is limited evidence from three randomized controlled trials in favour of controlled breathing. Evidence showed that controlled breathing resulted in a statistically significant increase in time to moderate nausea and a decrease in the mean symptoms of motion sickness compared to spontaneous breathing. Evidence is of very low certainty and results cannot be considered precise due to limited sample size.

Activities

There is limited evidence from one randomized controlled trial in favour of listening to music and from one non-randomized controlled trial in favour of distraction. The randomized controlled trial study showed that listening to music resulted in a statistically significant increase in time to moderate nausea in people experiencing mild nausea due to motion sickness. The non-randomized controlled trial showed that distraction resulted in a statistically significant decrease of subjective misery (measuring nausea, vomiting, dizziness, headache, (cold) sweat, and stomach awareness). When looking at counting compared to not counting to treat motion sickness, two randomized controlled trials could not demonstrate a statistically significant decrease in motion sickness symptoms. In three experimental studies, it was shown that reading or watching a video resulted in a statistically significant increase in motion sickness perception. In one randomized controlled trial, it was shown that short yells ("controlled yelling") resulted in a significant reduction of motion sickness symptoms compared to no yelling. All evidence is of very low certainty and results cannot be considered precise due to limited sample size, lack of data and large variability of results.

Prevention

There is limited evidence in favour of:

- Looking outside: Five studies showed that looking outside results in a statistically significant decrease in symptoms compared to looking at the inside environment. However, this could not be shown in a sixth study. Similarly, one study showed that looking at the horizon resulted in a statistically significant decrease in motion sickness compared to not looking outside. However, this decrease could not be demonstrated when comparing looking at the horizon to looking outside.
- Keeping the eyes open: It was shown in one study that keeping the eyes open resulted in significantly less motion sickness compared to keeping the eyes closed. However, this could not be demonstrated in three other studies.

- Performing a task on a high-mounted tablet: In one non-randomized controlled trial, people were asked to sit down in the passenger seat of a car and perform a task on a tablet that was either mounted at eye-height (high visual display, offering considerable peripheral out-the-window views) or onto the glove compartment (low visual display). The high visual display resulted in a statistically significant decrease in symptoms, compared to the low visual display.
- Restricting one's field of vision or fixating on a central point: When compared to an unobstructed view, no fixation point, or inside view only, restricting the field of vision or fixating on a central point resulted in a statistically significant decrease in mean illness rating and subjective symptoms of motion sickness and nausea, based on four studies.
- Light conditions: It was shown in one study that light conditions resulted in a statistically significant decrease in the time to reach a sickness rating of 2–4 (on a scale of 6), compared to dark conditions. However, a statistically significant difference in the number of subjects reaching a sickness rating of 2–4 (on a scale of 6) in light conditions compared to dark conditions could not be demonstrated.

In addition, three studies were unable to demonstrate a statistically significant decrease in mean illness rating when looking inside or outside, compared to wearing a blindfold, or when having an unobstructed view compared to a narrowed forward view. All evidence is of very low certainty, and results are imprecise due to limited sample size and lack of data.

Seating

There is limited evidence in favour of using a high backrest and sitting in a forward orientation, from one experimental study each. One study found that sitting with a high backrest resulted in a statistically significant decrease in mean illness rating compared to sitting with a low backrest. Another study showed that forward orientation resulted in a statistically significant decrease in motion sickness compared to backward orientation.

Additionally, there is limited evidence to support either sitting in the middle rear seat or sitting behind the driver. Results from one study could not demonstrate a statistically significant decrease in mean illness rating when seated in the central rear seat compared to sitting directly behind the driver. Furthermore, there was no demonstration of a statistically significant decrease in mean illness rating when seated in the first row of a multi-purpose vehicle, compared to sitting in the second row. All evidence is of very low certainty, and results are imprecise due to limited sample size and lack of data.

Driving oneself

There is limited evidence from three experimental studies in favour of driving oneself. One study showed that having control over the vehicle's movement resulted in a statistically significant decrease in motion sickness symptoms compared to having no control. It also showed that being or moving as if you were the driver (i.e. actively tilting your head instead of passively following the motion, thereby imitating the driver) resulted in a statistically significant decrease in total symptom score, compared to being a passenger or moving as if you were a passenger. Evidence is of low certainty and results are imprecise due to limited sample size.

Eating and drinking

There is limited evidence from four experimental studies in favour of eating before travelling. It was shown that having breakfast resulted in a decrease in nausea and motion sickness, compared to not having breakfast. It was also shown that eating a zero-fat meal resulted in a statistically significant decrease in nausea compared to eating a high-fat meal. In addition, having a high-protein meal compared to eating an entirely carbohydrate-based meal or no meal at all resulted in a statistically significant decrease in the subjective symptoms of motion sickness.

A significant decrease in motion sickness could not be demonstrated for carbohydrate meals or high-carbohydrate meals combined with low to moderate protein, compared to no meal or drinking water. Furthermore, a statistically significant decrease could not be demonstrated when comparing a high-protein/low-carbohydrate meal to either a low-protein/high-carbohydrate meal or a moderate-protein/high-carbohydrate meal.

Another study demonstrated that chewing peppermint or ginger gum resulted in a statistically significant decrease in motion sickness (but not nausea), compared to not chewing these items.

There is limited evidence from one experimental study in favour of taking ginger before travelling. Results showed that a 1,000 or 2,000 mg dose of ginger had a statistically significant decrease in nausea during and after the illusion of the body in motion, compared to a placebo. These effects could not be shown in a second study.

There is limited evidence from one experimental study, either in favour of drinking milk or water, or nothing at all. When comparing drinking milk or water to not drinking anything, a statistically significant decrease in subjective symptoms of motion sickness could not be demonstrated.

All evidence is of very low certainty and results of this study are imprecise due to the limited sample size and lack of data.

Wrist bands

There is limited evidence from seven experimental studies in favour of wearing P6 acupressure or P6 acustimulation wristbands. When analysing this evidence, we placed a higher value on the outcome of subjective symptoms of motion sickness over peak total symptoms score or nausea (as it is one of the many symptoms of motion sickness). Studies showed that P6 acupressure or P6 stimulation resulted in a statistically significant decrease in subjective symptoms, compared to the control, dummy point acupressure or a placebo. Another study showed that P6 acupressure had a statistically significant increase in time to moderate nausea, compared to the control. When comparing the use of P6 acupressure or P6 acustimulation to a placebo, the evidence did not demonstrate a statistically significant decrease in symptom severity, peak total symptoms score, subjective symptoms or nausea. Evidence is of very low certainty and results are imprecise due to limited sample size, lack of data and large variability of results.

MENTAL DISTRESS

Traumatic event

Key action

Provide support to those who have experienced a traumatic event. Listen, be empathetic, maintain contact and connect the person to other resources.

Introduction

From a psychological perspective, trauma refers to any disturbing experience that results in significant fear, helplessness, dissociation, confusion or other disruptive feelings intense enough to have a long-lasting negative effect on a person's attitudes, behaviour and other aspects of functioning. Traumatic events include those caused by human behaviour (e.g. sexual and gender-based violence (SGBV), conflict, industrial accidents) as well as by natural hazards (e.g. earthquakes) and often challenge an individual's view of the world as a just, safe and predictable place (American Psychological Association, n.d.-c).

A traumatic event involves exposure to a perceived or actual threat of death, serious injury or violence. Examples of such events include severe accidents, fires, robberies, physical attacks, violent attacks, disasters and any form of sexual and gender-based violence. The word "exposure" covers different events; it could be a direct experience, witnessing something traumatic or learning about a loved one experiencing such an event. A traumatic event is usually unexpected, unavoidable and dangerous.

Trauma-informed practice in first aid involves recognizing and responding to the psychological and emotional needs of individuals who have experienced traumatic events. This approach emphasizes safety, trustworthiness, choice, collaboration and empowerment.

This section provides a brief introduction on how to support people experiencing a traumatic event. It aims to provide learners with tips to develop greater awareness and streamline first aid procedures. It does not expect the learners to deliver psychological first aid (PFA) without formal training.

Guidelines

- Integrating PFA principles (listening, being empathetic, maintaining contact and connecting to other resources) to provide support to those who have experienced a traumatic event may help to reduce trauma-related anxiety.*

Good practice points

- The following interventions are recommended to support those who have experienced a traumatic event:
    - Engage in conversation.
    - Listen to the person's concerns.
    - Offer empathetic support.

    - Maintain contact as long as the first aid provider can, and calm the person in distress.
    - Connect to additional support resources or networks.
    - Encourage professional support if the person continues to experience difficulties in their daily functioning (more than one month).
- Integrating psychological first aid principles when assisting people in distress may help them during or in the immediate aftermath of an event, and can continue to support them in the days, weeks, months and even years that follow.
- Do not pressure individuals who have experienced a traumatic event to talk about the event. Avoid asking for details of the event. Instead, focus on their current needs and feelings and let them share their experiences on their terms.

Chain of survival behaviours

Prevent and prepare

- Ensure that first aid providers are trained in trauma-informed care principles, particularly in PFA. This includes understanding the impact of trauma and recognizing signs and symptoms.
- Establish safe spaces for providing first aid, free from potential triggers or stressors.
- Before offering support to others, first aid providers should pay attention to their own psychological well-being and readiness. Because they may also find themselves exposed to trauma, loss and devastation, injury and even death in an emergency or crisis. It is important for the first aid responders to work closely and communicate their conditions and needs in challenging situations with their team (IFRC Psychosocial Centre, 2015).

Early recognition

How a person experiences and reacts to a traumatic event is unique. Some may experience psychological distress and feelings of shock immediately after an event, but eventually adapt well to daily life. Others may have persistent, intense post-traumatic stress reactions that disrupt their daily functioning. Common reactions include intrusive behaviour, avoidance, dissociation, negative mood and arousal symptoms. Specific stressors (such as the level of experienced pain), individual characteristics, and conditions (such as the level of social support) impact a person's ability to cope.

- Quickly and calmly assess the situation, recognizing signs of physical injury and emotional distress. Approach the person with a calm and reassuring demeanour, acknowledging their distress and ensuring they feel safe.

First aid steps

To address the immediate needs of people experiencing a traumatic event, skills and techniques from Psychological First Aid (PFA) will be useful. Provide support with the concepts of LOOK, LISTEN and LINK.

1. Administer appropriate physical first aid, such as stopping bleeding, immobilizing injuries or performing CPR, while maintaining a calm and supportive presence.

2. Provide emotional support by listening, validating feelings and offering reassurance. Use simple and clear communication to explain each step of the care process (LOOK, LISTEN, LINK).

Access help

- If the situation requires advanced medical care, promptly call emergency services. Ensure the person knows help is on the way.
- Work collaboratively with emergency responders, providing them with relevant information about the person's physical and emotional state.
- Empower the person by involving them in decisions about their care and respecting their choices and preferences.
- If possible, involve peers or family members who can provide additional support.

Education consideration

Context considerations

- People can experience a crisis on a global, local and personal level.
- Programme designers should be aware of the support networks in their area and link to these resources in the educational material. This includes links to the professionals who are appropriate for the culture and context.
- Be aware of and sensitive to cultural, historical and gender-related factors that may affect the individual's experience
- In some contexts, there is a stigma associated with dealing (or not dealing) with psychological trauma. Include education on destigmatization, including what it means and how it can be done in that specific context.
- Empower the person by giving them a voice in their care and respecting their choices.
- Be aware of the different laws and policies in providing support to survivors of SGBV.

Learner considerations

- Consider the different types of vulnerable populations learners are most likely to encounter. For example, are learners most likely to provide support to young children? In this case, education should focus on the particular vulnerabilities of children and acknowledge the link to potential mental health challenges children may face later on in life as a result of a traumatic event. Conversely, if learners interact more with older adults who have experienced multiple bereavements and traumatic events (including significant changes in their health), learners should be aware that this group of people may have increased loneliness, isolation, anxiety and depression.
- Each individual will come to the learning environment with their own set of experiences and personal history. They have likely experienced elements of trauma, distress and loss. Facilitators need to acknowledge this at the beginning of the session and plan for potential disclosures or emotional moments.
- Encourage the familiarization of different distress reactions to avoid re-traumatization.
- Include standard PFA training in first aid education.
- Remind learners that first aid providers are not trained psychological professionals and that PTSD requires professional psychological interventions, which are beyond the scope of first aid.

Facilitation tips

- Emphasize the importance of self-care. Learners must understand that supporting others in crisis can be overwhelming. They need to learn to recognize their own triggers and have strategies in place to maintain their own mental and physical health.
- Facilitate a discussion on the types of traumatic events people may face. How can learners support individuals after a traumatic event? Does anyone have experience doing so?
- Help learners recognize that there are different types of loss. Some provide closure while others are left unresolved (ambiguous loss).
- Not all people exposed to the same traumatic events respond in the same way. It is because people also have different levels of resilience to cope with the event. Acknowledge the diversity and uniqueness of individual experiences and how these affect the way people respond to and cope with trauma.
- Facilitate a discussion on the stigma of post-traumatic stress and how people behave differently in the aftermath of traumatic events.
- Provide information on local support networks and how learners can contact them.
- Learners should practise PFA skills, including active listening. This involves addressing the verbal and nonverbal (such as facial expression and body language) cues of a person.
- Explain that during or immediately after a severely distressing event, many people react by going into what is commonly known as a state of shock; they may feel numb, in disbelief or like time stands still (IFRC, 2018). Physical reactions of an increased heartbeat, sweating, shaking, trembling or shortness of breath may also accompany these feelings. Some people feel dizzy or nauseous, which can make it difficult for them to think clearly or grasp the situation at hand. These reactions can last for minutes or hours during or after an event, but can have a more sustained effect on some. (Note this type of "shock" is an emotional response and is different from clinical shock caused by a failure in the circulation system.)

Facilitation tools

- Learners can work together to build case studies in which they have to support individuals in coping with a traumatic event.
- Be sure to correctly define sexual and gender-based violence.
- Show video(s) explaining the difference between empathy and sympathy. Learners can discuss and attempt to use empathetic responses in different scenarios or conversations when supporting individuals.
- Learners can share their own experiences of being listened to. Explore the good qualities of an active listener and discuss some attitudes or behaviours to be avoided when recalling personal experiences.

A common tool used in PFA is Look, Listen, Link. See *Psychological First Aid* published by the Red Cross Red Crescent Movement MHPSS Hub for details of this.

It is incredibly important to create and maintain a safe learning environment. Learners should feel safe to share and discuss their ideas and experiences without fear of judgment.

Scientific foundation

Systematic review

Critical incident stress debriefing (individual level)

A single-session debrief is when people are encouraged to share their emotions and thoughts after experiencing a traumatic event. Several systematic reviews and meta-analyses found that a single session debrief does not prevent the onset of post-traumatic stress, and may even increase the risk (Ancarani et al., 2025; Rose et al., 2002; Stileman & Jones, 2023; van Emmerik et al., 2002). As a result, the WHO guidelines and National Institute for Health and Care Excellence (NICE) guidelines do not recommend using single-session individual debriefing after a traumatic event.

Psychosocial support group intervention

The Centre for Evidence-Based Practice (CEBaP) developed an evidence summary about the effect of a brief psychosocial support group intervention shortly after a potential traumatic event on the development of adverse mental health outcomes. The review identified five randomized controlled trials, two non-randomized controlled trials, and eight cohort studies which studied the effect of Critical Incident Stress Debriefing (CISD), stress management education and a group intervention called "512 Psychological Intervention Model" based on CISD with additional training on group cohesion. The largest experimental study and three smaller randomized controlled trials found no evidence of an effect of CISD on post-traumatic stress disorder symptoms. Limited evidence was found for an effect of CISD on aggression (but only in participants with high exposure to potentially traumatic events, not in the total sample), alcohol use, non-specific psychopathology and coping. On the other hand, an effect of CISD on depression, anxiety and quality of life could not be demonstrated. Limited evidence was found showing that the 512 Psychological Intervention Model resulted in a decrease of post-traumatic stress, anxiety and depression, compared to CISD or no intervention, which might suggest that stimulating group cohesion is an added value. In two studies the effect of psycho-education as a group intervention on mental health outcomes could not be demonstrated.

Communication and social support

An evidence summary developed by CEBaP and updated in 2024 identified seven cohort studies. The results are outlined below.

The following factors are thought to be associated with fewer symptoms of post-traumatic stress disorder after a traumatic event:

- Higher engagement and concern ("expressed concern") from the romantic partner, such as asking how the partner is feeling, encouraging them to talk about feelings and showing interest in what they are going through
- Positive disclosure, specifically sharing positive emotions linked to military missions with individuals without combat experience

The following factors are associated with more symptoms of post-traumatic stress disorder after a traumatic event:

- Negative response or social reaction (turning against the victim, such as blaming the victim) to the disclosure of an attack of (sexual) violence
- Positive disclosure, specifically sharing positive emotions linked to military missions with individuals with combat experience

An effect on symptoms of post-traumatic stress could not be demonstrated for the following factors:

- Negative disclosure: sharing negative emotions linked to the event.
- Positive social reaction to disclosure of an attack of (sexual) violence.
- Negative social response in the form of unsupportive acknowledgement.
- Social support, including positive support (i.e. the availability of others, confiding in others, emotional and practical support), satisfaction with perceived support, and the extent to which a person experiences emotional support (i.e. the number of people a person can talk to and share concerns with)
- Dysfunctional communication during conflict: (lack of) mutual constructive communication, demanding/withdrawn communication, mutual avoidance and withholding and ineffective discussion

The evidence is of very low certainty and results cannot be considered precise due to lack of data and limited sample sizes.

Psychological first aid

Psychological first aid is a method of helping people in distress to feel calm and supported in coping with their challenges. It addresses both the emotional and social needs of individuals, with the intention of helping people use their resources, enhance their resilience and make informed decisions. There are a limited number of studies that researched the effectiveness of psychological first aid as a complete programme. Two outdated systematic reviews on psychological first aid both concluded that there is a lack of controlled studies to support it (Dieltjens et al., 2014; Fox et al., 2012). However, more recently, eight randomized controlled trials became available, although they are at high risk of bias (Hermosilla et al., 2022; Wang et al., 2024). In these studies no consistent improvement of PTSD symptoms or depression could be demonstrated; however in four studies a significant reduction of anxiety was shown when compared to the control being psychoeducation, a group discussion, social acknowledgement or drawing (Wang et al., 2024).

Non-systematic review

Psychological first aid intervention principles

Psychological first aid, provided by trained people, is widely supported by expert opinion and rational conjecture as a tool to help people who have experienced a traumatic event(s) (Shultz & Forbes, 2013).

Through observation and expert experience, there is a widespread consensus and support for the five intervention principles that should guide and inform any psychosocial support intervention and prevention efforts at the early to mid-term stages of an emergency. These principles facilitate survivors' short-term adjustment and long-term adaptation after a crisis (Hobfoll et al., 2007). The five principles involve the promotion of:

- calm
- hope
- connectedness
- a sense of safety
- a sense of self-efficacy and community efficacy.

First aid for mental health problems

In 2019, the Belgian Red Cross-Flanders developed guidelines to provide first aid to people experiencing mental health problems based on a systematic review of scientific evidence (evidence summaries developed by CEBaP, as mentioned above), expert opinion and the preferences of the target population. The guidelines, updated in 2024, include specific recommendations to support people exposed to shocking events (Stroobants et al., 2023).

Sexual and gender-based violence (SGBV)

Within the scope of providing first aid, individuals may encounter situations where the injured people have experienced some forms of sexual and gender-based violence, such as genital injuries in both adults and children. Sexual and gender-based violence (SGBV) is a broad term referring to any harmful act that leads to (or is likely to lead to) physical, sexual or psychological harm or suffering to someone on the basis of their gender. Gender-based violence is a result of gender inequality and abuse of power, including but not limited to the imposition of sexual violence, domestic violence, trafficking, forced or early marriage, forced prostitution and sexual exploitation and abuse (IFRC, 2015). It was estimated that about one-third of women experience some type of SGBV in their lifetime (World Health Organization, 2024c). It is also crucial to consider SGBV committed against men, boys and sexual minority groups despite the lack of data on its occurrence globally. SGBV can take different forms and happen in diverse situations and contexts across the world and is now a focus of humanitarian challenges (International Committee of the Red Cross and the International Federation of Red Cross and Crescent Societies, 2015; International Federation of Red Cross and Red Crescent Societies, 2015).

Reactions to trauma

The IFRC Reference Centre for Psychosocial Support (2018) found that during or immediately after a severely distressing event, many people react with a feeling of shock (numbness, disbelief or like time stands still). They may also have physical reactions such as an increased heart rate, sweating, trembling or shortness of breath. Some people feel dizzy or nauseous and may find it difficult to think clearly or grasp the situation at hand. These reactions can last for minutes or hours during or after an event. In some cases, people may be severely impaired by their reactions. In other instances, people may remain relatively calm and actively stick to their routines, especially if they have already had the chance to develop practices for the emergency. Particularly in the first hours and days after the event, reactions can vary significantly between people, and may also change rapidly on an individual basis. A rapid change commonly appears as “loud” reactions like shouting or crying and “silent” reactions like feeling numb or being unable to recognize the full impact of the event.

Reactions after an initial state of shock vary depending on each person’s perceived severity of the event. If the event was traumatic and frightening, the person might feel relieved that they survived, but also guilty, sad or angry if others were hurt or killed. Sometimes there can be fear

that the frightening event will happen again, such as aftershocks after an earthquake or the possibility of further violence in a situation of armed conflict. In this state, it can be challenging to make decisions and to communicate clearly with others.

Many people experience physical reactions in the first few days after a distressing event, such as physical pains, and may lose their appetite or ability to sleep. If a person's life has changed dramatically due to a distressing event, it may be difficult to carry out everyday activities and focus on the next steps. Some people may feel enormously angry with other people and the world. In contrast, others may experience a sense of deep sadness and grief or hopelessness about the future and lose interest in interacting with others or doing things they used to do. Withdrawal, disappointment, avoiding others and feeling misunderstood are also common reactions to a crisis.

Suicidal ideation

Key action

Engage the person in conversation, assess the suicidal threat, ensure safety and link to appropriate resources while providing empathetic support.

Introduction

Suicidal ideation refers to the situation in which a person thinks about ending their own life. The presentation of suicidal ideation can vary from being fleeting and vague to very concrete. Concrete ideation involves method selection, planning and/or intention to complete suicide. A person could act upon ideation, undertaking an action in which they expect to end their own life. Depending on the fatality of the outcome, the action is considered a suicidal attempt or suicide. According to the World Health Organization, close to 800,000 people die due to suicide every year (World Health Organization, 2025). It is a global phenomenon that spans multiple countries. Yet, suicides are preventable with a comprehensive multi-sectoral prevention strategy.

Vulnerability for suicidality is determined by a complex interaction of biological, psychological and social factors. Exposure to stressful life events can contribute to the development of suicidal ideation. During or immediately after a severely distressing event, many people react by going into what is commonly known as a state of shock, where it feels like time stands still, along with feelings of numbness and unreality. This can be accompanied by physical and emotional reactions. In some cases, people may think of attempting suicide or even perform suicidal behaviour (Howarth et al., 2020).

Self-harm is when someone intentionally hurts themselves, for example, by cutting or burning their skin, or poisoning themselves (IFRC Psychosocial Centre, 2018). It should be noted that not all self-harm is suicidal behaviour, so it is important to explore what the self-harming actions mean to the person affected. The most important distinction between self-harm and suicidal behaviour is the intent to take one's life.

Suicide is when someone intentionally takes their own life (IFRC Psychosocial Centre, 2018). Suicidal ideation refers to thoughts about or a preoccupation with killing oneself (American Psychological Association, n.d.-b). Attempted suicide, also called a suicide attempt, is a deliberate but incompleted attempt to take one’s own life (American Psychological Association, n.d.-a). It is important to always take someone who threatens to harm or kill themselves seriously and not leave the person alone till more help arrives (IFRC Psychosocial Centre, 2018).

Guidelines

- Having a confidant or someone to talk to may decrease the risk of suicidality.*
- Staying connected to and befriending the person at risk may decrease psychological distress in people with suicidal ideation.*

Good practice points

- Psychological first aid principles can be used when helping people with suicidal ideation.
- The following actions may help people with suicidal ideation:
    - Engaging the person in conversation.
    - Assessing the risk of suicide and harm.
        - Talk openly about suicidal thoughts.
        - Ensure personal safety in case of an immediate threat.
    - Listening non-judgmentally.
    - Encouraging the person to seek professional support and other social support.
    - Ensuring the safety and protection of the person.

In emergency and imminent risk situations:

- DO NOT leave the individual alone.
- Call emergency services.
- Remove any means of self-harm.
- Bring the individual to a safe, supportive environment, if possible.
- Include trusted supports of the individual (such as a friend or family member), if possible.
- Consult with and involve the supervisor or a Mental Health and Psychosocial Support (MHPSS) specialist as soon as possible during the situation.

Chain of survival behaviours

Prevent and prepare

- Obtain updated information about safe and available resources and referrals from supervisors, MHPSS-trained professionals or staff.
- Before offering support to others, first aid providers should pay attention to their own psychological well-being and readiness because they may also find themselves exposed to trauma, loss and devastation, injury and even death in emergencies or crises. It is important for the first aid responders to work closely and communicate their conditions and needs in challenging situations with their team (IFRC Psychosocial Centre, 2018).

Early recognition

Individuals may present themselves in very different ways when they are in despair and at risk of self-harm or suicide. One person may never mention their intent to harm themselves and may appear calm, despite how they are feeling inside. Another person may be openly expressing their desire to end their life. There are a variety of ways that individuals may present themselves, including:

- visibly distressed
- apathetic
- calm
- depressed
- anxious
- affected by alcohol or drug use
- erratic.

Warning signs in adults

There are certain warning signs that may indicate a person is thinking about or planning suicide. These include:

- Threats of suicide or self-injury.
- Planning for suicide (e.g. searching for methods, acquiring means). The risk that somebody will take their own life increases if somebody has a clear plan (how, where, when), has the means to execute the plan, and/or declares the intention to act.
- Talking, writing or online posting about death or suicide.
- Making arrangements, appearing to “say goodbye”, getting affairs in order.
- Affective changes include pronounced negative feelings (e.g. hopelessness, feeling stuck with no way out, anger, vengefulness, seeing no reason to live, feeling like a burden to others, anxiety or dramatic mood changes.
- Changes in behaviour such as increased risk behaviour (e.g. recklessness, increased consumption of alcohol or other substances), sleep problems or social withdrawal.

Warning signs in youth

Certain warning signs may indicate a young person has a higher risk of performing suicide. These include:

- changes in sleeping and eating habits
- loss of interest in activities they previously enjoyed, such as sports or art
- isolating themselves or withdrawing from family and friends
- headaches, stomach aches and other physical symptoms that cannot be explained by a medical condition
- refusing to go to school or beginning to do poorly in school
- talking about death often or asking questions about death
- researching or looking up ways to die
- drawing pictures, writing stories, plays, or creating other artwork about death or suicide
- hopelessness
- giving away their favourite things
- saying things like "I wish I were dead" or "It would be better if I weren't here".

First aid steps

To address the immediate needs of people having suicidal ideation, the principles, skills and techniques from psychological first aid (PFA) are useful. You may provide support with the concepts of LOOK, LISTEN and LINK.

Communicate clear limits on confidentiality. The person who is at risk must understand that if the first aid provider believes the person is in imminent risk of harming themselves, the first aid provider will need to break confidentiality to help keep the person safe.

1. Never leave a person alone if they have expressed that they are at risk.

    a. If you are on the phone or working remotely with the person, try to get emergency backup numbers for people in their lives with whom they trust and feel safe, if at all possible, as well as information on their current location. [LOOK, LISTEN]
    b. If the person is at home, invite someone from the household to support the person, if it is safe to do so. [LINK]
2. Have the individual remove anything that could be used to harm themselves [LOOK, LISTEN]. Ask carers to help with this, if possible. [LINK]
3. If you are meeting someone in person and you think they may be at risk of harm, make the space as safe and secure as possible.
    a. This may mean finding a quiet, calm place to speak, removing anything dangerous, or perhaps moving away from a room on an upper level of a building or from one with the windows open. [LOOK]
4. Use stabilization, calming techniques and basic helping skills to help keep the person calm and to reduce distress. [LISTEN]
5. Always contact your supervisor or refer to MHPSS-trained professionals or staff when responding to someone at risk. [LINK]
6. When someone has already attempted suicide (e.g. intoxication or excessive bleeding), the main course of action is to provide first aid and medical attention immediately. After stabilization, refer to a mental health professional for follow-up. [LINK]

Access help

- Ensure the person is not alone before leaving to get help. [LINK]
- Ask if the person knows where to seek help and advice. Be aware of and inform the person about the range of professional help available. [LINK]
- Encourage the person to see a health/mental health professional. [LINK]

Education considerations

This section provides only a brief introduction of how to support people having suicidal ideation. It aims to provide tips for learners to develop more awareness and to streamline the first aid procedures. It does not expect learners to deliver PFA without formal training.

Context considerations

- In some contexts, suicide is considered illegal, and there are corresponding laws and regulations of which first aid providers should be aware.
- Talking about suicide does not increase the likelihood of someone attempting it. Discussing suicide openly and sensitively can help reduce stigma, provide support and encourage individuals to seek help.
- Consider whether there is any stigma surrounding mental health and suicide within the context and adjust education accordingly, aiming to diminish stigma.
- Language used to refer to suicide and self-harm should be carefully considered. Phrases like "commit suicide" should be avoided, as they suggest a criminal or immoral element to the act, which may increase stigma and discourage people from seeking help. Language such as "attempted suicide," "took their own life," and "died by suicide" is generally more accepted among those affected by suicide.

- Programme designers should consider the local statistics of suicide (e.g. increased numbers of children or older adults feeling suicidal and completing suicide) and develop programmes specific to the groups with higher risk, being careful not to stereotype.
- Trainers should avoid causing psychological harm and should not ask trainees to share personal experiences related to the topic (IFRC Psychosocial Centre, 2021).

Learner considerations

- Children and young people may focus on recognizing unusual behaviour in friends and how to appropriately inform a trusted adult. Often, they will be concerned about confidentiality and breaking "trust". Emphasize the importance of getting help.
- Programme designers should ensure the depth and level of training and the support available are appropriate to the first aid provider. This will vary among different countries and first aid education programmes.
- Avoid stigmatizing language (e.g. in English, "commit suicide" emphasizes criminality).
- Consider the culture and faith of learners and adapt education appropriately.
- Complete standard PFA training.

Facilitation tips and tools

- Explain the concepts as follows:
    - Suicidal ideation is when someone is thinking about taking their own life.
    - Suicidal behaviours are actions that a person might take to attempt to take their own life.
    - Suicide attempt is when someone actively tries to take their own life.
- Create a safe space for learners to report if they are affected by this topic and access any necessary support. Establish ground rules with the group to ensure confidentiality, respect and sensitivity.
- Have two facilitators present for sessions so that specific support can be offered to individuals if necessary.
- Explore and address myths or misconceptions that the learners may have. These may include concerns about "planting thoughts" or the types of at-risk people.
- Use case studies that explore the behaviours mentioned and risk factors (e.g. a person who has had significant life events). Focus on recognizing signs of concern rather than on "assessment".
- Discuss how to have difficult conversations. What things can you say? What to avoid?
- Practise asking difficult questions to understand concerns and fears. Stress the importance of doing so.
- Use a video of a person's story, as people often find it difficult to empathize. Ensuring a human approach is vital.
- Emphasize that it is the first aid provider's role to get assistance if necessary and that they should take any threat of suicidality seriously.

A common tool used in psychological first aid is Look, Listen, Link.

Scientific foundation

Systematic review

An evidence summary developed by the Centre for Evidence-Based Practice (CEBaP) identified 12 studies that looked at communication to people with suicidal ideation (Stroobants et al., 2023). The evidence is of low quality, and results cannot be considered precise due to the low number of events and large variability of results. The evidence has been declared stable, so no further updates were conducted.

Appraisal of or having a confidant

There is limited evidence to support the benefit of appraisal of having a confidant (i.e. the perceived availability of someone to talk to about one's problems). It was shown that the appraisal of or having a confidant resulted in a statistically significant decrease in the risk of suicidality, compared to not having a confidant.

Evidence is of very low quality and results cannot be considered precise due to the limited sample size, the low number of events and a large variability of results.

Staying connected to and befriending

There is limited evidence in favour of staying connected to the person at risk, such as through means of sending postcards. In one study, after hospital discharge, postcards were sent every few weeks or months. In these postcards, a doctor asked how the person was doing and whether they wished to drop them a note. It was shown that sending postcards resulted in a statistically significant decrease in suicidal ideation and suicide attempts, compared to not sending any postcards. A statistically significant decrease in suicidal death when sending postcards compared to not sending postcards could not be demonstrated.

There is limited evidence in favour of befriending. This involved using a trusting and non-judgemental approach to providing care and opportunities for people to talk about their life events in a calm, relaxing and safe environment. In the study, the people stayed in a respite centre for a time-limited four-night period. It was shown that this method resulted in a statistically significant decrease in psychological distress from pre to post and follow-up measurements. Evidence is of very low quality and results cannot be considered precise due to the limited sample size and lack of data.

Psychological first aid intervention principles

Psychological first aid is a method of helping people in distress to feel calm and supported in coping with their challenges. It addresses both the emotional and social needs of individuals, aiming to help them utilize their resources effectively, enhance their resilience and make informed decisions. There are a limited number of studies that have researched the effectiveness of psychological first aid as a complete programme. Two existing systematic reviews on psychological first aid both concluded that there is a lack of controlled studies to support it (Dieltjens et al., 2014; Fox et al., 2012). However, more recently, eight randomized controlled trials became available, although they are at high risk of bias (Hermosilla et al., 2022; Wang et al., 2024). In these studies, no consistent improvement of PTSD symptoms or depression could be demonstrated; however, in four studies, a significant reduction of anxiety

was shown, when compared to the control being psychoeducation, a group discussion, social acknowledgement or drawing (Wang et al., 2024).

Non-systematic review

Guidelines for suicide developed via Delphi methodology

The Delphi method is a methodology of reaching expert consensus. Several guidelines were developed using Delphi methods (Colucci et al., 2011; Kelly et al., 2008; Ross et al., 2014).

There are five basic actions when responding to suicide - "ALGEE" (Mental Health First Aid Australia, 2014):

- Assess the risk of suicide and/or harm.
- Listen non-judgementally.
- Give reassurance.
- Encourage professional support.
- Encourage other supports.

Psychological first aid intervention principles

Psychological first aid provided by trained persons is widely supported by expert opinion and rational conjecture as the tool to be provided by trained persons for people who have experienced a traumatic event (Shultz & Forbes, 2013).

Through observation and expert experience, there is widespread consensus and support (Inter-Agency Standing Committee (IASC), 2007) for the five principles that should be used to guide and inform any psychosocial support intervention and prevention efforts at the early to mid-term stages of an emergency. These five principles facilitate survivors' short-term adjustment and long-term adaptation to the impact of disasters (Hobfoll et al., 2007) and involve the promotion of:

- calm
- hope
- connectedness
- a sense of safety
- a sense of self and community efficacy.

First aid for mental health problems

In 2019, the Belgian Red Cross-Flanders developed guidelines to provide first aid to people experiencing mental health problems based on a systematic review of scientific evidence (evidence summaries developed by CEBaP, as mentioned above), expert opinion and the preferences of the target population. The guidelines include specific recommendations to support people with suicidal ideation) (Stroobants et al., 2023).

Signals of suicidal ideation

Many people experiencing suicidal ideation exhibit signals during the suicidal process which could be observed by others.

Warning signs of suicidal threat include (Belgian Red Cross-Flanders, 2025):

- Threats of suicide or self-injury.
- Planning for suicide (e.g. searching for methods, acquiring means). The risk that somebody will take their own life increases if somebody has a clear plan (how, where, when), has the means to execute the plan and/or declares the intention to act.
- Talking, writing or online posting about death or suicide.

Other possible signals of suicidal ideation include (Belgian Red Cross-Flanders, 2025):

- Making arrangements, appearing to "say goodbye", getting affairs in order.
- Affective changes include pronounced negative feelings (e.g. hopelessness, feeling stuck with no way out, anger, vengefulness, seeing no reason to live, feeling like a burden to others, anxiety or dramatic mood changes.
- Changes in behaviour such as increased risk behaviour (e.g. recklessness, increased consumption of alcohol or other substances), sleep problems or social withdrawal.

Risk and protective factors for suicide

Suicide risk is assessed based on the risk factors, protective factors and circumstances of the suicide attempt if the person survives after such an attempt. Examples of risk factors for suicide include the following (IFRC Psychosocial Centre, 2020):

- presence of depression
- presence of psychosis
- sex (the risk ratio of male: female is 2:1)
- age (the older the age, the higher the risk)
- single, separated, divorced or widowed
- presence of alcohol or substance misuse
- previous history of a suicide attempt
- presence of a suicide plan
- lack of social support
- presence of chronic illness (e.g. chronic pain).

Examples of protective factors for suicide involve (IFRC Psychosocial Centre, 2020):

- strong perceived social support
- close family relationship
- good coping and problem-solving skills
- having a sense of meaning and purpose in life
- ability and willingness to seek help
- access to resources.

Circumstances of non-fatal suicide attempt that indicate a higher risk:

- planning in advance
- precautions to avoid discovery
- no attempts to obtain help afterwards

- final acts (e.g. writing a suicide note or making a will, transferring savings to a close relative's account, asking someone to help take care of small children)
- dangerous method (e.g. a lethal dose of substances was used; the use of a violent method). The person's perception of the lethality of the method used should also be considered.

Professional help in the case of suicidal ideation should always be encouraged. A trained healthcare professional should conduct a thorough assessment of suicide risk and consider the possibility of an underlying mental illness that can lead to the same.

Supporting a suicidal person can be stressful, so first aid providers should guard their personal boundaries and take care of themselves. A first aid provider should do their best for the person they are helping. However, despite best efforts, some people will still die by suicide.

Acute grief

Key action

Support the person in experiencing their grief in a way that respects their individual needs, and link them to their social supports.

Introduction

Grief is a normal response to the loss of a loved one or important things (IFRC Psychosocial Centre, 2020a). It is often caused by bereavement, or a challenging, devastating, yet perhaps common experience—especially if the loss was sudden and unanticipated. Typical acute grief reactions are often characterized by emotional and physical distress and difficulty functioning, but should not be diagnosed as a psychiatric disorder (C. F. Reynolds III et al., 2023). Although the grief reactions usually become less intense over time, grieving processes do not involve a fixed number of stages or a standardized linear recovery pattern. Rather, they reflect highly unique experiences, symptoms, evolutions and durations. Grief fluctuates over time, with an individual balance of alternating behaviours that move between loss and recovery.

Despite the often painful and disruptive experience, most people adapt quite well to managing grief in daily life. However, bereavement increases the risk of lingering physical and mental health problems. People can become stuck in their grieving process, experiencing persistent intense loss reactions and disruptions to daily life. While all kinds of losses are unpleasant, some losses can be devastating. The following section focuses largely on loss of life, which often has an immense impact on survivors' lives (IFRC Psychosocial Centre, 2017).

Witnessing or experiencing a loved one's sudden decease, such as in an accident, severe disease or suicide, can be one of the most distressing and traumatizing experiences in one's life. People's response is often intensified when death comes unexpectedly. The common reactions are shock, denial, anger, guilt, despair, hopelessness and depressive feelings (IFRC Psychosocial Centre, 2017). The sudden loss may lead people to be under the condition of acute grief. It is critical for first aid providers to support the bereaved at this vulnerable stage.

Sometimes, people who lost their loved ones may not be able to be with them in their final moments and express their love and respect. In these circumstances, some individuals may feel intense sadness, pain, remorse and guilt, and some may struggle to go about their daily lives. Despite not being able to be near the body of a loved one, there are still many things that survivors, or those left behind, can try out to ease the agonizing grief and loss and honour the memory of those who have died. In addition to the usual rituals, there are several actions that may help during mourning (IFRC Psychosocial Centre, 2023).

This section has only provided a brief introduction on how to support people experiencing acute grief. It aims to provide tips for learners to develop more awareness and to streamline first aid procedures. It does not expect the learners to deliver psychological first aid (PFA) without formal training.

Guidelines

- Family, parents or caregivers should be allowed time to hold or be with their deceased family members after death to say goodbye. Letting loved ones know how and why they died may be helpful to deal with their grief.*
- Provide family members the option to be present during adult resuscitation from cardiac arrest.*
- Talking about grief, communicating with people grieving and providing emotional support may be helpful for the grieving person to deal with their grief. Communication avoidance may contribute to unresolved grief and anxiety.*

Good practice points

- During the process of first aid, it may be beneficial to keep relatives or friends updated regularly during the process of resuscitation and allow time alone with a deceased person.
- The following interventions are recommended to support those who are experiencing acute grief:
    - Listen to the person's concerns.
    - Respect each person's unique grieving process. Let individuals share their experiences on their own terms.
    - Offer empathetic support.
    - Encourage accessing other support.
- Linking the person to their social support is an essential part of the healing process. Meanwhile, first aid providers can listen actively, provide general care and practical help, support the person to arrange family or community memorial ceremonies for the deceased and offer to accompany the bereaved to a support group (IFRC Psychosocial Centre, 2017).
- First aid providers should refer to mental health and psychosocial support (MHPSS) trained staff or volunteers and religious personnel to facilitate cultural or religious rituals, providing information and discussion of mourning or related issues, and look for follow-up care in the healthcare setting in facilitating the grieving process.
- Allowing family or caregivers time to hold or be with their children after death to say goodbye and letting loved ones know how and why children died, may be helpful to deal with their grief.
- Institutions should develop clear policies and protocols to support healthcare professionals in making decisions about family presence and equip them with the necessary education to manage these stressful situations effectively.
- PFA principles and skills may be used in helping people facing death and dying, especially in the acute stage.
- In addition to the usual rituals, there are several actions that may help during mourning, especially for those who are not able to be with their loved ones in their final moments, to say goodbye:
    - Feelings of gratitude: Thanking loved ones who have died and acknowledging how they contributed to feelings of worthiness and love.

- Reconciliation with difficult feelings experienced in the past: This may be a time to honestly express difficult feelings and express forgiveness.
- Expressing love and affection: Express your love, care, and prayers for the deceased.
- Expressing your farewell: Say farewell words to loved ones, expressing the importance of their role in life and memories built together

(IFRC Psychosocial Centre, 2023)

Chain of survival behaviours

Prevent and prepare

- Be open-minded and aware that the process of grief is unique to each individual. Some people may grieve intensely while others may be very controlled and reserved. Learn to adapt and accommodate the different ways that people express their needs.
- Before offering support or comforting others in grief, pay attention to your own psychological well-being and readiness because you may also be exposed to trauma, loss and devastation, injury and even death in emergency or crisis situations. It is important to work closely and communicate your conditions and needs in challenging situations with your team (IFRC Psychosocial Centre, 2015).

Early recognition

The way a person looks, feels, or behaves when grieving is unique to that person. However, early recognition can focus on observing and attentively listening to the following:

- Disruption of normal life:
  - The world feels fundamentally changed after a significant loss.
  - Usual routines, plans and activities lose meaning or importance.
  - The person may feel directionless or question the purpose of life.
- Shift in priorities and beliefs:
  - Things once considered important may now seem trivial.
  - The loss can challenge personal beliefs, including religious or spiritual values.
  - Questions about life's meaning and existence often arise.
- Grief as a natural process:
  - Grief is a necessary emotional response to loss, not a sign of weakness.
  - It allows the person to process and release emotional ties to the deceased.
  - It can be seen as an extension or expression of love for the person who died.
- Cognitive and emotional signs:
  - Constant thoughts about the deceased person.
  - Vivid recollections of shared memories or key moments.
  - Overwhelming feelings of sadness, sorrow, anger or resentment.
- Behavioural signs:
  - Tendency to isolate from others and withdraw socially.
  - Avoidance of social interaction may initially help, but long-term isolation is harmful.
- Duration and complexity:
  - Grief is a long-term emotional process that varies in length and intensity.
  - Patience and understanding from others are crucial.

(IFRC Psychosocial Centre, 2017)

First aid steps

To address the immediate needs of people experiencing acute grief, skills and techniques from Psychological First Aid (PFA) are useful. You may provide support with the concepts of LOOK, LISTEN and LINK.

1. Introduce yourself and say you are available to support if the person does not know you. [LOOK, LISTEN]
2. Encourage the person to move to a safe space if there are potential hazards. Ensure the person does not feel crowded; create space if possible. [LOOK]
3. Directly ask the person how you can assist them. Express concern and understanding. [LISTEN]
4. Give the person your full attention. Listen carefully to the grieving person and accept their feelings and reactions, whatever they may be. [LISTEN]
5. Encourage the person to be with loved ones within their household or keep in touch remotely with other members of their family and with other support systems, rather than self-isolating. [LINK]
6. Encourage taking breaks from painful emotions by suggesting activities that provide time for a break and allow the person to focus on something else other than their emotions all the time. [LISTEN]
7. Encourage the person to reach out to their support network when needed. [LINK]

(IFRC Psychosocial Centre, 2020-b)

A first aid provider can provide support to someone witnessing resuscitation by:

- Including significant others on what is happening. Regular updates of the person's situation during resuscitation may reduce the feeling of helplessness.
- Asking the significant other if they are comfortable witnessing the resuscitation. Witnessing the resuscitation process may help the bereaved to cope better with grief over time. If the significant other is seeing the resuscitation, ensure that someone is there to support them.
- Allowing relatives and friends time alone with the body; to see, touch, and talk to the deceased as much as they are comfortable. They should be prepared for what the deceased will look like before viewing the body, especially when the deceased has been severely injured or disfigured. Spending time with the body can facilitate grieving and reduce feelings of guilt, helplessness and isolation.

Access help

- Ensure the person feels okay before leaving them. [LOOK, LISTEN]
- Ask if the person knows where to seek help and advice if the impacts of grief continue. Be aware of and inform the person about the range of professional help available. [LINK]
- Encourage the person to see a health/mental health professional if grieving causes distress. [LINK]

Education considerations

Context considerations

- Acknowledge that when the loss of life is sudden, for example in a car accident, a violent assault or an earthquake, the response is often intensified. There is little or no opportunity to prepare for the loss, to say good-bye and to prepare for bereavement. Shock, denial, anger, guilt, despair, hopelessness and depressive feelings are common reactions when death comes unexpectedly (IFRC Psychosocial Centre, 2017).
- If someone survives a disaster where others have died this can complicate the grieving process. Especially in the case of sudden loss, survivors may find that memories of the event dominate their minds. They may suffer from survivor guilt. Parents may accuse themselves of not being able to protect and save their children. While people process their reactions to loss in different ways, for many people it is important to talk about feelings of guilt or shame, to prevent those feelings from growing and becoming unbearable (IFRC Psychosocial Centre, 2017).
- First aid providers should be aware of the cultural factors that are related to grief. The way people deal with death or loss is also strongly influenced by the culture. Different cultures have different ways of expressing grief, of paying respects to the dead and of mourning those who have been lost.
    - Burial and mourning rituals help people grieve. They mark the point where the chaos caused by the death of loved ones moves onto a stage where acceptance and grieving of the loss become possible.
    - Rituals give religious or spiritual meaning and provide comfort to the bereaved.
    - Rituals and traditional ceremonies provide a space for family, friends and other members of the community to share a common loss. They provide crucial moments in which the bereaved feel supported and others acknowledge their pain.
    - The grieving process may be complicated in situations where traditional rituals supporting grief cannot be carried out as usual (IFRC Psychosocial Centre, 2020b).
- Apart from being aware of the cultural factors, first aid providers can take the following into consideration:
    - Reassure a grieving person that what they feel is normal.
    - Avoid telling the bereaved what they should be feeling or doing.
    - Emphasize there is no right way to grieve nor is there a timeline.
    - Do not judge or take grief reactions personally as grief may involve extreme emotions and behaviours that can be difficult to understand.
    - Do not pressure anyone to move on or make them feel like they have been grieving too long; this can actually slow their recovery.
    - Be aware that anniversaries and commemorations can trigger the pain related to the loss, even years later (IFRC Psychosocial Centre, 2020b).

Learner considerations

- Each individual will come to the learning environment with their own set of experiences and personal history. It is likely that they have experienced elements of trauma, distress and loss. It is important for facilitators to acknowledge this at the beginning of the session and plan for any disclosures or emotional moments.

- Complete standard PFA training.

Facilitation tips

- Work with a co-facilitator if possible to be able to privately support a learner who is openly emotional, as well as to be able to check in with each other emotionally and professionally (i.e. on the educational process). If you are unable to work with a co-facilitator, consider finding a break early in the session and allowing participants to connect with you privately about their past experiences. This may allow you to meet participants in a safer space.
- At the beginning of a session, establish a communication plan between the facilitator and learners. If a topic is triggering distress, learners need a way to communicate their need to address it or take a break from the session to decompress.
- Emphasize the importance of self-care. Learners must understand that supporting others in crisis or who are experiencing loss(es) and grief can be overwhelming. They need to learn to recognize their triggers and have strategies in place to maintain their own mental and physical health.
- Provide information on local support networks and how learners can contact them.
- Learners should practise active listening. This involves addressing the verbal and nonverbal cues (such as facial expressions and body language) of a person.

Facilitation tools

- Learners can work together with MHPSS-trained staff or volunteers to develop case studies that support individuals in coping with grief and loss. This also enables learners to make the learning relevant to their environment.
- Develop interactive activities that enable learners to openly explore the concepts of grief and loss with each other. Consider using “think, pair, share” activities where learners think about a concept on their own, discuss it in pairs, then share their learning with the larger group.
- Integrate the LOOK, LISTEN, LINK techniques of PFA.

Scientific foundation

Systematic review sources

We identified several systematic reviews on the different aspects of caring for acute or sudden bereavement and an evidence summary from the Centre for Evidence-Based Practice (CEBaP) about communication with bereaved or grieving people.

Spending time alone with the deceased

A systematic review of the sudden death of children found consistencies across many studies showing that parents want time to hold and be with their deceased child to say goodbye. Some qualitative studies described that when parents desired but were unable to have a private and peaceful space to say goodbye to their child, it increased their regret and grief. However, a minority of bereaved parents strongly felt that they did not want to see their deceased child (Garstang et al., 2014).

Family presence during resuscitation

The International Liaison Committee on Resuscitation (ILCOR) performed a systematic review on family presence during adult cardiac arrest resuscitation (Berg et al., 2023a; Berg et al., 2023b). The included studies were heterogeneous, and the evidence was of very low certainty. Overall, no evidence of harm to patients or families was found across the studies, notwithstanding variability in practices and outcomes of family presence during resuscitation.

Based on these findings, ILCOR suggests offering family members the option to be present during both in-hospital and out-of-hospital adult resuscitation. In addition, two good practice statements were issued: (1) Institutions should develop policies or protocols to guide healthcare professionals in family presence decisions. (2) Professionals should receive education on managing these high-stress situations, including family distress and their own emotional responses. In summary, family presence is supported as an option that respects family choice and may improve coping, provided it is implemented with structured guidance, staff training and sensitivity to context.

Knowing the "how" and the "why"

Based on the same systematic review by Garstang et al. (2014), evidence found consistencies across many studies of child deaths that parents want to know how and why their child died. Studies revealed that the information about the child's death helps parents in making sense of the tragedy and facilitates the grieving process. Particularly when the death is unexpected, finding out the cause of death is important to help reduce parents' emotional stress. Information can also reassure parents that the child did not suffer and that everything possible was done to save their life. This knowledge can help to reduce any guilt parents might feel. Some bereaved parents tend to suspect that a lack of information means authorities are deliberately withholding knowledge from them.

Talking about grief

An evidence summary from CEBaP in 2019 found limited evidence demonstrating the benefits of talking about grief (Stroobants et al., 2023). The evidence has been declared stable, so no further updates were conducted. While we did not identify a causal relationship between the results, we did conclude specific associations between grief and speaking about it.

In bereaved parents of deceased children, evidence showed that there is a statistically significant association between a decrease in grief and positive communication about one's grief as time increased from the loss of the child. However, a statistically significant association between a partner's concern for their grieving partner, and actual grief of both partners could not be demonstrated.

Studies also identified statistically significant associations between relationships outside that of a parent and child.

- In bereaved siblings, there was a statistically significant association between talking about loss and a decrease in grief and anxiety. There was also an association between satisfaction and the amount of time spent talking about the loss.

- In the bereaved children of a deceased parent, studies showed a statistically significant association between the remaining parent or caregiver's positive, emotional words and a decrease in the bereaved children's anxiety and depression, especially as time increases since the loss. Moreover, there is a statistically significant association between the decrease in unhealthy grief and the increase in mother communality. However, a statistically significant association between a decrease in depression and an increase in mother communality could not be demonstrated.
- In bereaved partners, a statistically significant association between increased disclosures of emotion at 4, 18 or 25 months post-bereavement and a decrease in distress could not be demonstrated. However, at 11 months post-bereavement, there was a statistically significant association between increased disclosure of emotions and an increase in distress.
- In bereaved students, a statistically significant association between more open family communication about grief and a decrease in feelings of grief could not be demonstrated.

The same evidence summary demonstrated harm caused by avoiding communication. The evidence is of very low quality and results are considered imprecise due to a low number of events and lack of data. While we did not identify a causal relationship between the results, we did identify several specific associations:

- There was a statistically significant association between not talking to one's parents about a deceased sibling and both unresolved grief and anxiety.
- The evidence showed that increased partner-oriented self-regulation (when partners avoid talking about their loss and try to appear strong in each other's presence) resulted in a statistically significant increase in bereaved parents' grief seven months after a loss. There was also a statistically significant association between an increase in current partner-oriented self-regulation and an increase in grief.
- A statistically significant association between bereaved students' grief and communication avoidance could not be demonstrated.

The evidence is of very low quality and results are considered imprecise due to a low number of events and lack of data.

Communicating and receiving emotional support

The evidence summary also identified studies that looked at communicating with grieving or bereaved people in general (not specifically grief-related communication). The evidence is of very low quality and the results are considered imprecise due to limited sample size and large variability. They could not infer any causal relationship from the results outlined below.

- In bereaved fathers of deceased children, results showed a statistically significant association between decreased grief and talking with friends.
- In bereaved children of a deceased parent, results showed a statistically significant association between both decreased anxiety and depression and an increase in parent-child communication.
- In bereaved adults, a statistically significant association between grief and communication within a family could not be demonstrated.

- In a healthcare setting, results showed that a phone call from the neonatologist led to a statistically significant decrease in loneliness, depression and feelings of guilt, compared to no phone call. However, a statistically significant decrease in anger and hostility with or without a phone call could not be demonstrated.

Psychological first aid

Psychological first aid is a method of helping people in distress to feel calm and supported in coping with their challenges. It addresses both the emotional and social needs of individuals, with the intention of helping people use their resources, enhance their resilience and make informed decisions. There are a limited number of studies that researched the effectiveness of psychological first aid as a complete programme. Two existing systematic reviews on psychological first aid both concluded that there is a lack of controlled studies to support it (Dieltjens et al., 2014; Fox et al., 2012). However, more recently, eight randomized controlled trials became available, although they are at high risk of bias (Hermosilla et al., 2022; Wang et al., 2024). In these studies no consistent improvement of PTSD symptoms or depression could be demonstrated; however, in four studies, a significant reduction of anxiety was shown, when compared to the control being psychoeducation, a group discussion, social acknowledgement or drawing (Wang et al., 2024).

Non-systematic review

In addition to the evidence from the systematic reviews, we also identified best practices as described by Kent and McDowell (2004) and from bereavement care practice guidelines.

Good practice from bereavement care practice guidelines

There are some studies regarding the development or application of bereavement care practice guidelines. A systematic review further identified a large variation in the quality of these guidelines (Kent et al., 2020). Nonetheless, the guidelines from the review share the following core values:

- Work with respect and integrity.
- Provide dignity to bereaved individuals and their deceased loved one.
- Provide high-quality, collaborative, accessible and adequately resourced care.

Updating friends and family every 10–15 minutes on any resuscitation progress

The bereaved must not feel excluded during the resuscitation process. Studies suggested that frequent updates of the patient's situation during resuscitation reduced the feeling of helplessness. Meanwhile, the feeling of exclusion and helplessness and remaining uninformed may lead to anger in the grieving process. Studies also showed that witnessing the resuscitation may help the bereaved to cope better with grief over time (to which there is no evidence that viewing would interfere with the resuscitation process). However, a nurse needed to accompany the bereaved.

Spending time alone with the deceased

It is important to allow relatives and friends time alone with the body; to see, touch and talk to the deceased as much as they are comfortable. They should be prepared for what the deceased will look like before viewing the body, especially when the deceased has been severely injured or

disfigured. Spending time with the body can facilitate grieving and reduce feelings of guilt, helplessness and isolation.

Accommodating cultural or religious rituals

Accommodation of cultural and religious rituals shows respect for the deceased and the bereaved, which will facilitate the grieving process. In supporting a bereaved family, it is important to pay attention to how the family addresses the dead body and to be aware of and receptive to the cultural and religious differences of different families. Doing so allows the helper to facilitate saying goodbye to the deceased in a humane and dignified way (World Health Organization, International Federation of Red Cross and Red Crescent Societies, & International Committee of the Red Cross, 2016).

Providing information and discussing relevant issues

If appropriate, the bereaved may wish to discuss issues such as organ or tissue donation post-mortem, funeral arrangements and attending support groups. Some studies revealed that the donation of organs or tissues makes death meaningful and helps the bereaved family members accept their loss.

Providing a hospital contact number and name of support nurse or doctor for follow-up care

Follow-up care from the hospital allows the bereaved family an opportunity to get more information about the death and may also be a source of comfort.

Psychological first aid intervention principles

Psychological first aid, provided by trained persons, is widely supported by expert opinion and rational conjecture as a tool to help people who have experienced a traumatic event(s) (Shultz & Forbes, 2013).

Through observation and expert experience, there is a widespread consensus and support for the five intervention principles that should guide and inform any psychosocial support intervention and prevention efforts at the early to mid-term stages of an emergency. These principles facilitate survivors' short-term adjustment and long-term adaptation after a crisis (Hobfoll et al., 2007). The five principles involve the promotion of:

- calm
- hope
- connectedness
- a sense of safety
- a sense of self and community efficacy.

First aid for mental health problems

In 2019, the Belgian Red Cross-Flanders developed guidelines to provide first aid to people experiencing mental health problems based on a systematic review of scientific evidence (evidence summaries developed by CEBaP, as mentioned above), expert opinion and the preferences of the target population. The guidelines include specific recommendations to support people experiencing grief (Stroobants et al., 2023).

Witnessing loved ones' sudden death or not knowing the whereabouts of loved ones can be one of the most distressing and traumatizing experiences in one's life. It is critical for helpers to provide appropriate and adequate support for the families at this vulnerable stage. Unlike death, when the loved ones go missing or disappear, there is uncertainty about whether they are dead or alive and such uncertainty leads to an ambiguous loss for the family. The fact that the person may still be alive somewhere, the fact that no remains have been recovered, means that the family cannot hold a burial ceremony and move forward with the grieving process as if the person is dead. This ambiguous loss sometimes remains unacknowledged, which causes further distress to the families (International Committee of the Red Cross, 2017).

Families who experience loss can react in a multitude of different ways. Below are just some of the ways people may respond to loss (Terlonge et al., 2012).

- Feelings: The person who experiences a sudden loss may have a range of feelings, including shock, numbness, intense sorrow and pain, sadness, depression, dejection, anxiety, tension, denial, anger, irritability, guilt, self-blame, self-criticism, insecurity, helplessness, hopelessness, yearning and nostalgia. Families with ambiguous loss may also feel emotionally isolated as they may believe that others do not understand their suffering (International Committee of the Red Cross, 2017).
- Thoughts: Grief can cause worrying, feelings of disbelief, denial of what has happened, confusion and problems with memory and concentration. It can also cause preoccupation and rumination over the loss and the idea of the presence of the missing or dead family member. Some may also experience feelings of alienation, unfamiliarity with their surroundings, the experience of unreality, suicidal thoughts, depersonalization and hallucinations.
- Physical sensations: Grief can cause physical sensations such as tightness and heaviness in the chest or throat, choking, nausea or stomach-ache, dizziness, headaches, numbness, muscle weakness, tension or fatigue. It may make the person vulnerable to illness.
- Behaviours: Grief can cause avoidance of memories of the deceased, weeping, sobbing, crying, hypo-or hyperactivity, sleep problems (reduced or interrupted sleep or excessive sleep), and increased use of medication, alcohol or other substances. Physical complaints such as headache, stomach-ache or nausea may arise without an identifiable physical cause. Sudden loss may trigger shock symptoms such as screaming, howling to shaking, difficulty in drinking or eating, crying spells and becoming more aggressive or irritable. Other extremes on the continuum of behaviour, such as staying numb, unresponsive to the outside world, inability to talk or move and loss of interest in daily activities, may also arise. Families with ambiguous loss may also present obsessive thoughts and speech, as well as repetitive and rigid patterns of behaviour (International Committee of the Red Cross, 2017).
- Social behaviours: Grief can cause social withdrawal or isolation. Families with ambiguous loss may feel unable to resume their familial and marital roles, rules and rituals, as they do not know whether the missing family member will ever return. In extreme cases, life seems to come to a standstill. They may also isolate themselves and refuse to reach out for help to avoid stigmatization. Stigmatization can be even more serious especially when the family member went missing in a violent conflict between two or more groups and

others became sceptical that the family is connected to “rebel” groups (International Committee of the Red Cross, 2017).

Children may have distinct reactions and changes too (International Committee of the Red Cross, 2017; Terlonge et al., 2012), such as:

- restlessness and change in activity level
- fearfulness and/or anger, especially when being left alone, or asking questions like “Why did it happen?” or “Will this happen to me or others?”
- regression to younger behaviours such as bedwetting despite having been toilet-trained, thumb sucking and refusal to sleep alone
- clinging to parents or showing anxiety to separation or fear of strangers
- withdrawal and unwillingness to discuss the loss
- symptoms of illness such as nausea, loss of appetite and diffuse aches and pains
- feeling guilty and placing blame on themselves.

Families of missing persons often require intensive psychosocial support during the difficult process of investigating disappearances. During the process of recovering and identifying remains, painful memories and intense emotions may surface particularly when the families are asked to provide ante-mortem data and blood or saliva samples for obtaining conclusive proof of death of the missing person, are informed of their loved one’s death, are present when the remains are recovered and/or are asked to identify or claim the remains and personal belongings of their loved ones (International Committee of the Red Cross, 2017).

Anxiety and panic

Key action

Help people feel calm.

Introduction

Anxiety is an emotion when people feel worried or tense and have physical changes like higher blood pressure (American Psychological Association, n.d.-a). It is a natural human response when people feel worried, afraid or tense about things that may happen in the future, or are under threat (Mind, n.d.). Along with fearful emotion, physical signs like muscle tension, fast breathing or rapid heart rate can be observed and may lead to a sudden onset of a panic attack (American Psychological Association, n.d.-b; American Psychological Association, n.d.-c).

A panic attack is a distinct episode of high anxiety during which a person feels fear or apprehension. The anxiety reaches its peak within 10 to 15 minutes. During a panic attack, the person can have many different physical symptoms, such as a faster heartbeat, shortness of breath, chest discomfort, profuse sweating, dizziness and light-headedness and nausea. Many people also feel very afraid, for example, of dying, losing control or fainting (Chalmers et al., 2022; IFRC Reference Centre for Psychosocial Support, 2018).

It is important to note that experiencing the emotion of anxiety is not equal to the mental health condition of anxiety disorder, which can only be diagnosed by mental health professionals like psychiatrists or psychologists.

This section only provides a brief introduction on how to support people experiencing anxiety or panic attacks. It aims to provide tips for learners to develop more awareness and to streamline the first aid procedures. It does not expect the learners to deliver psychological first aid (PFA) without formal training.

Guidelines

- Integrating PFA principles when providing support (through listening, being empathetic, maintaining contact and connecting to other resources) may help to reduce anxiety.*
- Using clear and direct communication may be helpful for a person experiencing anxiety.*

Good practice points

- First aid providers should help the person feel calm, provide a safe environment and listen to the person. The provider may also try quiet and focused breathing exercises to help someone feel calmer (IFRC Reference Centre for Psychosocial Support, 2018).
- First aid providers may try some of the following examples to help calm the person:
    - Keep a calm and soft tone of voice.
    - Remain calm as this will have a calming effect on the person in distress.

    - If culturally appropriate, try to maintain eye contact (without staring) while talking to the person. Maybe gently put an arm around the person or gently stroke their back (only if it is appropriate and they are comfortable with this action).
    - Remind the person of the intent to help and that they are safe (if it is true).
    - Encourage the person to breathe through the nose, feel the breath fill up their belly slowly and then breathe out slowly through the mouth (IFRC Psychosocial Centre, 2017).
- If the physical reactions continue, the first aid provider should call for medical help.
- Encourage professional support if someone is experiencing excessive anxiety that interferes with daily life.

Chain of survival behaviours

Prevent and prepare

- Acknowledge that reactions of anxiety or panic attacks may occur in distressing events, crises or stressful environments. These reactions may take place immediately or develop gradually over time (IFRC Reference Centre for Psychosocial Support, 2018).
- Recognize that panic attack symptoms can resemble those of a heart attack or other medical conditions.

Differences between a panic attack and a heart attack:

- Onset: Panic attacks often come on suddenly and peak within minutes, while heart attack symptoms can start slowly and persist.
- Duration: Panic attacks typically last for a few minutes, whereas heart attack symptoms can last longer and may come and go.
- Triggers: Panic attacks can occur without a clear trigger, while heart attacks are often related to physical exertion or stress.
- Chest pain: Panic attack chest pain is usually sharp and localized, whereas heart attack chest pain is more likely to feel like pressure or squeezing and may radiate to other areas.

Early recognition

- If you suspect a panic attack, ask the person if they know what is happening and if they have experienced a panic attack before.
- If the person has not had a panic attack before and does not think they are having one, see chest pain, and feeling faint.
- Inquire if the symptoms are related to a known medical issue.

First aid steps

To address the immediate needs of people experiencing anxiety or a panic attack, skills and techniques from Psychological First Aid (PFA) are useful. You may provide support with the concepts of LOOK, LISTEN and LINK.

Look

1. Introduce yourself if the person does not know you.
2. If the person is disoriented or confused, reassure them that they are safe and you are available to support.

3. Encourage the person to move to a safe space if there are potential hazards or create a safe space and ensure the person does not feel crowded if multiple people are present.
4. Remove any object or person causing obvious distress.

- While with the person, observe their body language to guide your support (e.g. is the person sitting still or moving around?).
- If you need to leave to find additional help, try to find someone else to check on the person.

Listen

1. Directly ask the person how you can assist them. If the person cannot communicate verbally, ask yes/no questions and encourage non-verbal responses (e.g. thumbs up for "yes"). Only ask questions that will help you assist the person.
2. Validate that their experience is uncomfortable, terrifying and stressful.
3. Reassure the person that there is nothing to be ashamed of.
4. If they feel like they are "going crazy", reassure them they are not.
5. Help the person get their breathing under control by demonstrating slow, even breaths.
6. When speaking with the person:
    a. Use positive, supportive language like "You will be okay, this will pass soon."
    b. Speak clearly, slowly, and use short sentences.
    c. Remain patient and calm.

Listen and Link

1. If coping strategies are working, encourage the person to continue using them.
2. After they use coping strategies, let them know they are doing a good job.

If the person refuses your help, ask if there is someone else they would like you to call.

Panic attack

The following interventions are recommended to support those who experience a panic attack:

1. Introduce yourself and explain that you are there to support.
2. Ensure safety. Look for a safe and private environment for the person to talk (IFRC Reference Centre for Psychosocial Support, 2018).
3. Ask the person if they realize that their symptoms could be a result of a panic attack.
    a. Explain that a panic attack is a reaction to a stressful situation and will likely lessen gradually (IFRC Reference Centre for Psychosocial Support, 2018).
    b. If in doubt whether it is a panic attack or a medical emergency, access emergency services.
4. Listen to the person's concerns.
5. Accept the person's feelings and reactions (IFRC Reference Centre for Psychosocial Support, 2018).
6. Offer empathetic support.
7. Speak clearly and softly, and be patient.

8. Remain calm and help the person slow their breathing.
    a. Demonstrate breathing in slowly and calmly and ask the person to do it with you. Inhale through the nose for one count and exhale through the mouth for three counts.
    b. Loosen any tight clothing.
    c. Encourage breathing from the abdomen.
9. Stay with the person until they are no longer in distress.
10. Connect the person to additional support resources or networks.

Access help

- Ensure the person is not alone before leaving to get help. [LINK]
- Ask if the person knows where to seek help and advice. Be aware of and inform the person about the range of professional help available. [LINK]
- If the person has recurring panic attacks or has changed their life to prevent them, reassure them that effective professional help is available. Encourage them to see a health/mental health professional if the panic attacks continue or cause distress. [LISTEN, LINK]
- Understand that a person experiencing a panic attack may want to seek medical attention due to fear of their symptoms. [LINK]

Recovery

- Provide psychoeducation about panic attacks (e.g. potential triggers) and guide them to the proper breathing exercises when experiencing a panic attack. [LISTEN]

Education considerations

Context considerations

- Cultural norms influence how a first aid provider responds to a person experiencing anxiety or a panic attack. It is necessary to develop cultural awareness. For example, is it appropriate to touch a person when helping them remain calm? A general rule is not to touch a person without permission or if it is unacceptable to them (IFRC Reference Centre for Psychosocial Support, 2018).

Learner considerations

- Complete standard PFA training.

Facilitation tips and tools

- Use role play or scenarios and ask learners to practise staying calm and responding to someone experiencing anxiety or a panic attack in a calm and relaxed manner.
- Invite learners to share how they help themselves calm down when feeling anxious, and then practise some of the calming exercises (e.g. slow breathing) outlined in this topic.
- Emphasize that communication is key to providing support effectively. Brainstorm appropriate communication strategies, such as:
    - Avoid talking too much, as this may overwhelm the person and increase their panic.
    - Understand that unfriendly or rude behaviour is not personal.
    - Allow the person to continue what they are doing unless it is a safety risk.

- Do not pressure the person to explain their panic.
- Acknowledge and validate the person's symptoms or experience.
- Avoid using phrases like "Don't panic" or "Just calm down".
- Acknowledge the person is having a panic attack and reassure them that they are safe; do not criticize or express pity.
- Ask permission before touching the person and do not grab, hold or restrain them.

Learning connections

- Integrate the LOOK, LISTEN, LINK techniques of PFA. (IFRC Reference Centre for Psychosocial Support, 2018).

Scientific foundation

Systematic review

An evidence summary developed by the Centre for Evidence-Based Practice (CEBaP) identified 12 studies that looked at communication with people with anxiety (Stroobants et al., 2023). The evidence is of very low quality and the results of these studies are imprecise due to a limited sample size and a lack of data. No causal relationships can be inferred from these results. The evidence has been declared as stable, so no further updates were conducted.

Talking with friends, clear and direct communication

There is limited evidence on the benefits of talking with friends/others and for clear and direct communication.

It was shown that there is a statistically significant association between a decrease in general anxiety and talking with friends and talking weekly or more to others, following a traumatic event such as the loss of a sibling or the loss of a teacher.

It was shown that there is a statistically significant association between indirect and unclear communication, family avoidance of communication, lower patient/family communication or lower perceived open communication regarding illness and an increase in anxiety in cancer patients or in people who lost a sibling. It was also shown that there is a statistically significant association between a child's emotional expression and a decrease in anxiety in the case of the loss of a parent. In addition, it was shown that there is a statistically significant association between good parent-adolescent communication in adolescents with higher reactive aggression and a decrease in anxiety; however, this could not be demonstrated in adolescents with higher proactive aggression.

In the specific case of family members of patients dying in the intensive care unit (ICU), it was shown that close communication with the ICU staff, where ICU staff listen, acknowledge family members' emotions and give room for questions, resulted in a statistically significant decrease of anxiety in the family members, compared to usual practice.

For children who lost a parent, a statistically significant association between a decrease in the child's anxiety symptoms and the surviving caregivers' positive emotion words or positive parental reinforcement could not be demonstrated.

Psychological first aid intervention principles

Psychological first aid is a method of helping people in distress to feel calm and supported in coping with their challenges. It addresses both the emotional and social needs of individuals, with the intention of helping people use their resources, enhance their resilience and make informed decisions. There are a limited number of studies that researched the effectiveness of psychological first aid as a complete programme. Two existing systematic reviews on psychological first aid both concluded that there is a lack of controlled studies to support it (Dieltjens et al., 2014; Fox et al., 2012). However, more recently, eight randomized controlled trials became available, although they are at high risk of bias (Hermosilla et al., 2022; Wang et al., 2024). In these studies, no consistent improvement of PTSD symptoms or depression could be demonstrated; however, four studies showed a significant reduction in anxiety when compared to the control of psychoeducation, a group discussion, social acknowledgement or drawing (Wang et al., 2024).

Non-systematic reviews

Guidelines for panic attacks developed via the Delphi methodology

The Delphi method is a methodology of reaching expert consensus. Several guidelines were developed using the Delphi method for supporting someone with a panic attack (Chalmers et al., 2022; Kelly et al., 2008). These guidelines recommend the following:

- When assisting someone with a panic attack, identify yourself, speak clearly and slowly, and be patient.
- Acknowledge the person's fear, reassure them it will pass soon, and ask if they need help or have had a panic attack before.
- The first aider should encourage the person to try to slow their breathing down gradually.

Guidance on specific treatments for a panic attack (e.g. breathing into a paper bag, repeating coping statements, grounding techniques) was not endorsed in these guidelines.

Psychological first aid intervention principles

Psychological first aid provided by trained persons is widely supported by expert opinion and rational conjecture as the tool to be provided by trained persons for people who have experienced a traumatic event (Shultz & Forbes, 2013).

Through observation and expert experience, there is widespread consensus and support (Inter-Agency Standing Committee (IASC), 2007)for the five principles that should be used to guide and inform any psychosocial support intervention and prevention efforts at the early to mid-term stages of an emergency. These five principles facilitate survivors' short-term adjustment and long-term adaptation to the impact of disasters (Hobfoll et al., 2007) and involve the promotion of:

- calm
- hope
- connectedness
- a sense of safety
- a sense of self and community efficacy.

In 2019, the Belgian Red Cross-Flanders developed guidelines to provide first aid to people experiencing mental health problems based on a systematic review of scientific evidence (evidence summaries developed by CEBaP, as mentioned above), expert opinion, and the preferences of the target population. The guidelines include specific recommendations to support people experiencing anxiety or panic attacks (Stroobants et al., 2023).

GLOSSARY AND REFERENCES

Glossary

Absence seizure	A type of seizure with less obvious signs and symptoms.
Acetylsalicylic acid	Acetylsalicylic acid is also known as Aspirin or ASA. It is a medication used to treat pain, fever or inflammation.
Active warming	The application of external heat sources to the skin (e.g. electric heating blanket).
Automated external defibrillator (AED, defibrillator)	An automatic external defibrillator (AED) is a portable electronic device which can analyse the rhythm of the heart and if necessary, may deliver an electric shock to help the heart return to its normal rhythm.
Afterdrop	The continued cooling of the body temperature after rewarming has started.
Agonal breaths	A medical term used to describe when a person is gasping or struggling to breathe. It tends to be associated with life-threatening conditions such as a heart attack or stroke.
AMS	Acute mountain sickness is a mild form of altitude sickness.
Analgesics	Any type of medication that provides pain relief.
Angina	A diagnosed condition that can be treated with medication. The person's arteries leading to the heart narrow, limit blood flow and cause chest pain.
Antidote	A substance capable of preventing a product from exerting its toxic effects.
Antipyretics	Substances that work to reduce body temperature.
Apnoea	The breathing stops, usually for a short time during sleep.
Aspiration	To drain a blister by puncturing it, leaving the top layer of skin in place.
Blood pressure	Blood pressure is measured using two measurements. The systolic pressure is the force at which the heart pumps blood through the arteries. The diastolic pressure is the pressure in the arteries between heartbeats, when the heart is resting.
Blunt force trauma	Blunt force trauma is physical trauma to a body part, either by a violent or high-velocity impact.
Borg Dyspnoea Scale	Borg Dyspnoea Scale is used to measure the breathing difficulty reported by a person to assess the severity of their disease.
Buccal glucose administration	Glucose is put inside the mouth on the lips or cheeks, where it is absorbed into the bloodstream.

Bystander effect	The phenomenon that the more people who are present at an emergency, the less likely anyone is to help, due to a diffusion of responsibility.
Carotid arteries	Major blood vessels in the front of the neck that supply blood to the brain, neck, and face.
Cervical spinal motion restriction	Cervical spinal motion restriction is the reduction or limitation of cervical spinal movement using a cervical collar, or sandbags with tape, combined with a long backboard. The definition may differ slightly according to the organization.
Community efficacy	Community efficacy is the extended sense that one's group can cope with the traumatic event and its associated tasks.
CPR	Cardiopulmonary resuscitation (CPR) is a technique of using chest compressions, usually combined with rescue breaths, to pump blood around the body, with the aim of keeping a person's vital organs alive until defibrillation can take place.
Cross-reality	Cross reality is a mixture of virtual and real-world elements. For example, playing a character in a fictional story (virtual world) but having to physically give CPR to someone in the story (real world).
Defibrillation	An electrical shock to the heart to restore a normal rhythm using a defibrillator. Using a defibrillator device increases survival of people having sudden cardiac arrest due to fibrillation. Fibrillation is rapid, disordered and inefficient heart contractions. There are automated external defibrillator devices which are safe for first aid providers to use on a person who is unresponsive with abnormal breathing.
Deroofing	Remove the top layer of skin of a blister.
Diphoterine	A solution used to wash away chemicals spilled on the body and eyes.
Dose attenuator	A dose attenuator modifies electrical energy delivered by a defibrillator based on the person's size.
DR ABC	DR ABC is a commonly used tool in English to help learners remember how to assess a scene and person. The letters stand for Danger, Response, Airway, Breathing, Circulation.
Duty of care	Duty of care is a legal obligation imposed on an individual or company requiring that they adhere to a standard of reasonable care while performing any acts that could foreseeably harm others.
Dyspnoea	Difficult or laboured breathing, a feeling of shortness of breath, tightness in the chest and the feeling of suffocation.
Emergency medical services (EMS)	For the Guidelines, the term "emergency medical services" (EMS) signifies that the first aid provider should quickly access the next available higher level of care. In some places, EMS may mean an

	ambulance service and hospital, while in others it may mean contacting a local health worker or travelling to a field hospital. Programme designers will need to adapt the language according to the local context in which it is used.
Encephalitis	An infection of the brain that is usually caused by a virus.
Endemic diseases	A condition or disease regularly found among a group of people or in a certain area.
Epigastric pain	Pain or discomfort right below the ribs in the upper abdomen.
Epiglottis	The flap at the back of the throat that can close to stop food and drink from going down the windpipe.
Epithelium	Epithelium is a body tissue which covers the surfaces of internal organs and body parts.
Epithelialization	The process of a layer of tissue forming to cover exposed internal vessels or organs as part of the healing process.
Erythema	Increased blood flow to an area of skin due to injury or infection. The skin may become redder, purple or darker.
ETCO2	ETCO2 indicates the amount of carbon dioxide in the air exhaled when breathing. A high level of carbon dioxide in the exhaled breath is an indicator of good breathing.
Extremity	Extremities of the body including arms, legs, fingers and toes.
Fraction	The proportion of resuscitation time without spontaneous circulation during which chest compressions were administered.
High altitude cerebral edema (HACE)	High altitude cerebral edema is altitude sickness affecting the brain, behaviour and alertness.
HAINES positions	HAINES stands for “high arm in endangered spine” and the positions are adapted recovery positions which raise the arm to support the head and spine.
Hanks’ Balanced Salt Solution (HBSS)	Hanks’ Balanced Salt Solution is a solution composed of salts and supplemented with glucose.
Haemostasis	The process of stopping bleeding. The blood thickens and clots to keep blood inside the damaged tissues.
High altitude pulmonary edema (HAPE)	High altitude pulmonary edema is altitude sickness affecting the lungs and breathing.
Hydrocolloids	Hydrocolloids are a type of dressings for wounds which maintain a moist and protected environment ideal for the healing process.

Hydrogel	Hydrogel dressings are used on wounds and provide a moist environment to promote healing.
Hyperlipidemia	A high concentration of fats or lipids in the blood.
Hypernatremia	High sodium levels in the body.
Hyperoxia	When the body or area of the body receives an excessive supply of oxygen.
Hyperventilating	Rapid or deep breathing, usually caused by anxiety or a panic attack.
Hyponatremia	Low sodium levels in the body.
Hypopnea	The breathing is very soft and shallow, usually during sleep.
Hypoxic	Hypoxic means there are low levels of oxygen in the person's blood resulting in their organs and tissues not receiving enough oxygen to work properly.
In vitro studies	In vitro studies are studies done in a controlled environment such as a petri dish.
Ischaemia	Ischaemia is a condition in which the blood flow (and therefore oxygen) is restricted or reduced in a part of the body.
LAPSS	Los Angeles Prehospital Stroke Screen (LAPSS) is a method of identifying potential stroke with glucose measurement.
Larynx	Often called the voice box, the larynx is in the throat and holds the vocal cords.
MASS	Melbourne Ambulance Stroke Screen is a scale including glucose measurement.
Mbar	Millibar, a metric unit of pressure.
Meningitis	An inflammation of the membranes surrounding the brain and spinal cord.
Meta-analysis	Examining many different research studies to find common results.
Morbidity of a disease	It is how many people have a disease in a particular society or population.
Mortality	The number of deaths within a particular society and within a particular period of time.
MRSA	MRSA is a type of bacterial infection, which is resistant to some types of antibiotics.
Myocardial revascularization	Myocardial revascularization is a medical procedure to improve blood flow to the heart (myocardium). Examples include angioplasty, stent or surgical coronary artery bypass grafting.

Narrowcasting	Narrowcasting is the transmission of television programmes to a localized or specialized audience.
Necrotizing fasciitis	Necrotizing fasciitis is a rare but serious infection that affects the tissue beneath the skin and surrounding muscles and organs.
New-born	A new-born is a baby from birth to about one month old.
National Institutes of Health (NIH)	The National Institutes of Health (NIH), is part of the US Department of Health and Human Services and is the nation's medical research agency.
No-flow time	No-flow time is the reported time from cardiac arrest to the start of bystander CPR.
Non-asphyxial cardiac arrest	Cardiac arrest due to cardiac disease origin.
Non-occlusive dressing	A dressing that does not seal the wound, allowing air and moisture to pass through it.
NSAIDs	Non-steroidal anti-inflammatory drugs.
Occlusive dressing	An occlusive dressing seals the wound and does not allow air or moisture to pass through it.
Oral glucose administration	Glucose is swallowed by mouth.
Oesophageal	This is all things related to the oesophagus which is the pipe that carries food from the mouth to the stomach.
P6	P6 is a point on the forearm that can be stimulated using techniques taken from acupuncture.
Paediatric defibrillator	A defibrillator that can analyse the heart rhythm of children. It also delivers the right level of energy in the electric shock for children.
Painkiller	Painkiller is an analgesic such as paracetamol (also known as acetaminophen) or ibuprofen.
Paracetamol	A painkiller which also reduces fever. Acetaminophen is the common name for the same product in some countries.
Pathophysiology	The abnormal state or function of part of the body due to disease or injury.
Perceived susceptibility	A person's subjective perception of the risks.
Perineal trauma	Perineal trauma or tearing is damage to the tissues and muscles in the vagina and anal area during childbirth.

Peripheral pulse	Peripheral pulse is a pulse at one of the peripheries of the body such as at the wrists or on the top of or just behind the feet.
Plaster	A sticking plaster is a small adhesive dressing, widely available in pharmacies. They are used on minor cuts and grazes that do not require a bandage.
Pleuritic pain	Pain when breathing in and out.
PPE	Personal protective equipment such as face masks or gloves.
Pressure immobilization technique	A technique for immobilizing and applying pressure to a leg or arm, to slow down the movement of the venom to vital organs.
Pruritus	The sensation of itchiness on the skin.
Radial pulse	A pulse that can be felt on your wrist.
Reciprocal learning	Involves individuals taking turns to coach each other on different knowledge or skills that they have already mastered.
Rhythm check timing	Rhythm check timing refers to the timing of the analysis of the heart rhythm. This can be done by a first aid provider taking the pulse immediately after the defibrillator has given a shock (or not).
Sciatica	Pain in the sciatic nerve (a nerve that starts in the lower back and extends down the legs).
Sexual and gender-based violence (SGBV)	Sexual and gender-based violence (SGBV) is a broad term referring to any harmful act that leads to (or is likely to lead to) physical, sexual, or psychological harm or suffering to someone on the basis of their gender.
Signs of life	Signs of life include things such as moving, crying or coughing.
Subcutaneous	An injection using a short needle to inject medication just under the skin.
Sublingual glucose administration	Glucose is put under the tongue where it is absorbed into the bloodstream.
Substernal pain	Pain just below or behind the sternum or breastbone (the bone in the centre of the chest).
Sucking or blowing chest wounds	An open chest wound in which air enters and exits with each breathing movement.
Tension pneumothorax	Tension pneumothorax can be caused by an open chest wound. Air enters the cavity (the pleural space) between the lung and the chest wall. The air builds up, creating pressure on the lung and reducing its ability to expand, making breathing difficult.

Thermal burns	Thermal burns are burns caused by heat such as fire, steam, or contact with something hot.
Thrombolysis	The use of medication to break down blood clots that have formed in the blood vessels.
Thrombolytic therapy	Thrombolytic therapy is a treatment to break down blood clots to improve blood flow.
Transcutaneous pulse oximetry	Transcutaneous pulse oximetry is a non-invasive method of measuring the oxygen level of the tissue below the skin.
Transthoracic impedance	Electrical activity in the chest that varies with changes in body size and composition.
Tympanic temperature	The tympanic temperature is that taken from the ear.
Umbilical cord prolapse	Umbilical cord prolapse means that part of the umbilical cord passes out of the uterus before the baby. This can result in pressure being applied to the cord as the baby is born, interfering with the supply of oxygenated blood reaching the baby during birth.
Uvula	The bit of flesh that hangs down at the back of the throat.
Valsalva manœuvre	The Valsalva manoeuvre involves taking a deep breath in, closing the nose and mouth and gently blowing out. This increases pressure in the chest resulting in reduced cardiac output and lower blood pressure.
Ventricular fibrillation	Ventricular fibrillation is an abnormal heart rhythm in which the heart trembles and no longer pumps blood. This means blood circulation in the body stops, so it is a life-threatening condition. This type of heart rhythm (fibrillation) is most responsive to a shock from a defibrillator.
Visceral pain	Visceral pain is pain from inside the pelvis, abdomen or chest. The nerve supply is less specific than skin nerves, and the pain in these areas may be vaguer than skin pain.
Visual analogue scale	A scale used to rate the severity of breathing difficulties during a test.
Vital signs	Vital signs that a first aid provider may be able to monitor include the person's breathing or pulse rate.
Warmed actively	Warming the body using items that actively warm it such as an electric heating blanket.
Warmed passively	Warming the body using items that will help the body retain heat such as a sleeping bag.
Washout periods	Washout periods are the periods between administering treatments.
Weal	Slightly protruding solid red pimple with no liquid that fades when the skin is pulled.

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THE FUNDAMENTAL PRINCIPLES OF THE INTERNATIONAL RED CROSS AND RED CRESCENT MOVEMENT

Humanity

The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.

Impartiality

It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

Neutrality

In order to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

Independence

The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

Voluntary service

It is a voluntary relief movement not prompted in any manner by desire for gain.

Unity

There can be only one Red Cross or Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

Universality

The International Red Cross and Red Crescent Movement, in which all societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.

The International Federation of Red Cross and RedCrescent Societies (IFRC) is the world's largest humanitarian network, with 191 National Red Cross and Red Crescent Societies and around 17 million volunteers. Our volunteers are present in communities before, during and after a crisis or disaster. We work in the most hard to reach and complex settings in the world, saving lives and promoting human dignity. We support communities to become stronger and more resilient places where people can live safe and healthy lives, and have opportunities to thrive.

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